

DRAFT

**Sediment Characterization Report
Port of Vancouver, Gateway
Expansion - Vessel Approach and
Turning Basin Project**

Prepared for

Port of Vancouver
PO Box 1180
Vancouver, WA 98666

Prepared by

Parametrix
700 NE Multnomah, Suite 1000
Portland, OR 97232-4110
503-233-2400
www.parametrix.com

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EXECUTIVE SUMMARY

The Port of Vancouver (the Port) proposes to dredge approximately 2,030,000 cubic yards of sediment material from the Columbia River in an area adjacent to the north side of the Federal Navigation Channel between River Mile (RM) 101 and 102 to accommodate a vessel approach and turning basin. The Port is proposing to maintain the turning basin at the proposed depth of 48 feet (43 feet plus 5 feet advance maintenance over dredge) below Columbia River Datum (CRD) for a period of 20 years, with approximately 260,000 cubic yards of dredge material being removed for maintenance every 4 years (i.e., 1,300,000 total cubic yards over 20-year period). The proposed project includes the construction of new berthing piers offshore of the 20 ft contour to accommodate large vessels.

Material will be removed using either a clamshell bucket dredge or a cutterhead suction dredge operated from a barge. No dredging is proposed above the -20 ft CRD, and the dredge cut slope will be 3:1 (or less) to minimize sloughing.

Dredged material will likely be disposed of as fill in an upland location at the Port of Vancouver Gateway site. This dredged material will likely be stockpiled near the Columbia River on Port of Vancouver property and will be dewatered, with return water flowing to the Columbia River.

In support of this project, Parametrix prepared, submitted, and received approval of a Draft Sediment Sampling and Analysis Plan (SAP) (Parametrix 2006) to conduct characterization of sediments proposed for removal during construction of the new vessel approach and turning basin. The SAP was developed according to the Dredged Material Evaluation Framework (DMEF) (USACE 1998).

Sediment characterization was conducted to evaluate sediment conditions and confirm that sediments and new surface material (NSM) in the dredging area are in compliance with DMEF and other relevant sediment quality criteria. In light of the sediment being disposed in an upland area on Port property, dredge material was also evaluated against applicable Model Toxics Control Act (MTCA) (WAC 173-340) criteria.

Samples were collected in October 2006, and were analyzed for the chemical and conventional sediment parameters listed in Table 8-1 of DMEF guidance (USACE 1998). A total of fifty-two sediment cores were collected as part the project. The sediment cores were processed, composited, and submitted for analysis by Severn Trent Laboratories, Inc. (STL) in Tacoma, Washington.

Results of the analyses reveal that all of the specified analytes are below DMEF, MTCA, and other relevant screening levels. As such, the sediment to be removed is acceptable for upland disposal.

1. INTRODUCTION AND BACKGROUND INFORMATION

A Draft Sediment Sampling and Analysis Plan (SAP) (Parametrix 2006) was developed in support of permit application for dredging at the Port of Vancouver (POV), Washington. Dredging is proposed as part of the POV – Gateway Expansion, Vessel Approach and Turning Basin Project and is designed to provide access for deep-draft cargo vessels at the proposed docks at Parcel 3 (Figure 1-2). The project will require the initial removal of approximately 1,950,000 cubic yards of sediment from the Columbia River adjacent to the POV facility. It is anticipated that dredged material will be disposed in an upland area on POV property.

Sediment characterization was conducted in October 2006 to evaluate sediment conditions and confirm that sediments in the dredge prism are characterized according to the Dredged Material Evaluation Framework (DMEF) and other relevant criteria, as approved by the Regional Management Team (RMT).

1.1 PROJECT LOCATION AND DESCRIPTION

The Gateway Expansion project location is Parcel 3 in the northern undeveloped portion of the Port of Vancouver along the Columbia River, between approximately RM 101 and 102. The project site lies in Section 40, Township 2 North, Range 1 West, Vancouver, Clark County, Washington, as illustrated on the Sauvie Island Oregon – Washington Quadrangle, United States Geological Survey 7.5 Minute Series. The site is known as the Columbia Gateway property. The proposed dredge prism is located on the Washington side of the Federal Navigation Channel, opposite the Columbia River confluence of the Willamette River (Figure 1-1). The project address is:

3103 Lower River Road
Vancouver, WA 98660

The Port of Vancouver proposes to dredge material from the Columbia River in an area adjacent to the north side of the Federal Navigation Channel, generally between RM 101 and 102, to accommodate a vessel approach and turning basin. The Port is proposing to maintain the turning basin at the proposed depth of 48 feet (43 feet plus 5 feet advance maintenance over dredge) below Columbia River Datum (CRD) for a period of 20 years, with approximately 260,000 cubic yards of dredge material being removed for maintenance every 4 years (i.e., 1,300,000 total cubic yards over 20-year period). The proposed project includes the construction of new berthing piers offshore of the 20 ft contour to accommodate large vessels, as shown in Figure 1-2. Further details of the area from which material is proposed to be dredged are shown in Figures 1-3A and 1-3B, which also show the proposed sediment sampling locations.

Material will be removed using either a clamshell bucket dredge or a cutterhead suction dredge operated from a barge. No dredging is proposed above the -20 ft CRD, and the dredge cut slope will be 3:1 (or less) to minimize sloughing (Figures 1-4 and 1-5).

Dredged material will likely be disposed of as fill in an upland location at the Port of Vancouver Gateway site. This dredged material will likely be stockpiled near the Columbia River on Port of Vancouver property and will be dewatered, with return water flowing to the Columbia River.

1.2 SITE DESCRIPTION AND HISTORY

The Port of Vancouver is located on the Columbia River between RM 101 and 105 in Vancouver, Washington. The Port of Vancouver includes berths for Break Bulk, Dry Bulk, Liquid Bulk and Auto unloading facilities. The Break Bulk facility, managed by the Port, handles a wide range of commodities, including pulp, lumber, plywood, and steel. Dry bulk includes grain, fertilizer, and metal ores. The liquid bulk dock handles bulk fuels; the floating auto dock is capable of high volume automobile unloading, sorting and staging.

The Port of Vancouver is primarily zoned Heavy Industrial, and light industrial with a River Industrial overlay by the City of Vancouver. The proposed Columbia Gateway project site is located between the Columbia River and Vancouver Lake in the northern portion of the Port of Vancouver property, approximately between RM 101 and 102. The expanded area is proposed for use as a Grain/Bulk Facility, Auto Facility and Industrial area.

2. SAMPLING APPROACH

2.1 SEDIMENT INVESTIGATION OBJECTIVES AND DESIGN

The sediment monitoring objectives for work described in this report include:

- Collect sediment within the proposed dredging area and determine whether the sediments to be dredged meet the applicable screening levels.
- Collect chemical and physical information to support upland disposal or reuse decisions.
- Collect chemical and physical information for sediments below the dredge prism to determine if chemical contaminants would be present in the new surface material (NSM).

The sediment investigation followed the DMEF (USACE 1998) and the Sediment Sampling and Analysis Plan Appendix: Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC) (SAPA) (PTI and McFarland 1995). The Port of Vancouver SAP was approved by the RMT on August 21, 2006. SAP approval documentation is contained in Appendix A.

Samples were collected in October 2006 and were analyzed for the chemicals and conventional sediment parameters listed in Table 8-1 of DMEF guidance, which is reproduced herein as Table 1.

2.2 NUMBER AND TYPE OF SEDIMENT SAMPLES

The DMEF guidance document describes the process by which the number of samples within a proposed dredge area is determined. Factors include river mile location in the Columbia River, type of facility, proximity to known chemical contaminant sources, and recent data from the site.

The Port of Vancouver proposed dredge area, between RM 101 and 102, is within RMs 0 to 106, which are generally considered “exclusionary” in the main stem of the Columbia River. The exclusionary ranking is based on available data that indicate that sediments within the Federal Navigation Channel of the Columbia River generally consist of coarse-grained sediment with at least 80 percent sand and a Total Volatile Solids (TVS) content of less than 5.0 percent. Sediments that are composed of greater than 80 percent sand, gravel or other naturally occurring bottom material and that have a TVS content of less than 5.0 percent, or sediments that meet this requirement and are targeted for beach nourishment or restoration, are excluded from further testing for aquatic disposal in the Lower Columbia River Management Area, provided that the sediments are not located within the likely impact zone of an active and significant contaminant source.

Sediments within the Federal Navigation Channel at RM 101 and 102 generally consist of material containing greater than 80 percent sand. However, available data from recent studies conducted in the region indicate the potential for sediments in the proposed dredge area to contain low concentrations of chemicals of concern, particularly PCBs. Table 5-2 of the DMEF indicates that those sites where available data indicate the potential for low concentrations of contaminants of concern (CoCs) to exist in the sediments will be given a low ranking. However, in addition to the project site being an area in which offshore barge staging occurs the project site is also located downstream of several potential sources of contamination. As a result, the site was given a moderate ranking by the RMT.

Table 6-1 of the DMEF indicates that for a moderate-ranked site, the number of samples to collect is one sample per 40,000 cubic yards of dredged material for homogeneous sediments. The proposed volume of sediments to be dredged is 1,950,000 cubic yards, resulting in 49 individual dredged material management units (DMMUs). Immediately prior to sediment sampling mobilization, it was determined that the proposed dredge volume may increase, pending additional engineering evaluation; the increase in dredged material volume was estimated to be 80,000 cubic yards. As a result, conservative application of the DMEF sampling intensity formula resulted in 3 additional DMMUs, for a total of 52 DMMUs (core/sample locations) and an approximate total of up to 2,030,000 cubic yards of material to be dredged.

2.3 SAMPLE STATION LOCATIONS

The locations of samples were determined based on dividing the entire dredge prism into 52 individual DMMUs, each representing approximately 40,000 cubic yards of sediment. Proposed sampling stations were located in the approximate center of each DDMU (see Figures 1-3A and 1-3B). Actual sampling locations are shown in Figures 2-1A and 2-1B. Analytical results are discussed in Section 7.

3. FIELD SAMPLING METHODS

3.1 STATION POSITIONING METHODS

Prior to mobilizing onto the river, sample location coordinates (latitude and longitude) were determined using CAD/GIS software. Once in the field, station positioning was accomplished from the sampling vessel using a differential global positioning system (DGPS). The coordinates of each sample location were entered into the on-board DGPS computer and displayed onscreen with a real-time indicator of the boat's position. The sampling vessel then set up in the pre-determined location, and, once on location, the DGPS was used to document the actual sampling position coordinates at the time the samples were collected. Actual sample coordinates were recorded on the core log sheet along with water depth measurements. For all sampling stations, latitude and longitude were recorded in the North American Datum (NAD83). Water depths recorded were later converted to elevations based on Columbia River Datum. Table 2 presents the in-field coordinates for each sampling location along with the mud line elevations and sample recovery for each location.

Prior to the sampling event, dredge prism cross-sections (from shore to toe of dredge prism) were generated such that sediment core locations could be plotted on the cross-section. This, along with record of the percent recovery (or core length) for each core, enabled field personnel to plot the core and determine which portions of the core represent material to be dredged and which portions represent NSM. The depth of the dredge prism is substantially less at the toe than it is at the shoreward edge of the prism. Appendix B includes copies of the cross-sections used in the field.

3.2 SAMPLING EQUIPMENT

Sediment cores were collected using a vibrocorer and pre-decontaminated 4-inch diameter aluminum core barrels supplied by the sampling vessel operator.

Stainless steel bowls, spoons, and other sampling utensils were used in the collection of the sediment samples and were decontaminated prior to sampling and sealed in aluminum foil unless used immediately after decontamination. The decontamination process utilized the following sequence:

- Initial wash and scrub with Alconox and site water
- Rinse and scrub with site water
- Rinse again with site water
- Rinse a final time with purified (de-ionized) water

Items such as aluminum foil upon which the sediment cores were laid was disposed of and replaced between each sample collection to ensure that the subsequent cores processed did not come in contact with residuals from the previous pair of cores.

3.3 SAMPLE COMPOSITING STRATEGY AND METHODS

3.3.1 Compositing Strategy

Sediment cores were collected from within each of the 52 DMMUs, the locations of which are shown in Figures 2-1A and 2-1B. As specified in the SAP, it was initially proposed that samples would be collected from each core in 4-foot intervals and analyzed separately, and

material representing NSM, if any, would be archived and sampled pending results of chemical analysis of the overlying sediment samples. However, during SAP revision negotiations with the regulating agencies, a revised sampling scheme was suggested and approved (Appendix A). The revised sampling scheme allowed for compositing the uppermost 10 feet of core sample from two adjacent DMMUs into one sample; NSM material would still be archived as initially prescribed. This modified sampling scheme resulted in a total of 26 samples, each of which represented 2 DMMUs. One duplicate sample was also collected for a total of 27 samples.

Although samples were composited over 10-foot intervals, discrete samples were concurrently collected from every 4-foot core interval and archived separately for possible follow-up analysis should any of the analyzed composite samples prove to be contaminated. If analytical results indicated contamination in the composite samples, having the archived samples on hand would allow for additional sub-analysis and more precise determination as to where the contamination, if any, occurs. Also, and equally important, the 4-foot interval scheme is conducive to real world dredging and sediment management in which material is typically handled in 4-foot lifts (penetration of dredge clamshell bucket).

3.3.2 Compositing Method

Following retrieval of the sediment cores and placement on the deck of the sampling vessel, the percent recovery was determined for each core. The portion of core containing sediment was then cut into 4-foot increments (typically 2 or 3 sections) and capped for storage on-board until processed. Prior to capping, the nature of the sediments visible at the top of each core and at the divisions between each core section was noted on the core log sheet. The cores were removed from the sampling vessel at the end of the each work day and stored overnight in a locked 16-ft truck or immediately transported to the processing facility for storage. While in overnight storage, the cores were kept on ice and in an upright position.

Core processing was initiated on the day following collection of each core. Core sections were split longitudinally using a circular saw and then placed onto the processing table along with the core sections from an adjacent DMMU (composite pair). Once opened, the sediment was described by the project geologist and logged on the sediment core log sheets. Copies of the sediment core log sheets are presented in Appendix B.

The next processing step first required identifying whether material in the cores represented sediment to be dredged or NSM (sediment to be dredged could be composited with the adjacent core while NSM was to be archived). This determination was made by plotting the location and length of the core on the dredge prism cross-sections mentioned above (see Appendix B). This enabled personnel to graphically represent the location of the core with respect to the upper and lower limits of the dredge prism, and also indicated the depth to which the core penetrated.

Once it was determined which portions of the sediment core were to be composited for analysis, equal volumes of sediment from the core pair were placed in stainless steel bowls and thoroughly mixed. The sediment was then transferred to the sample containers in preparation for shipment to the lab.

As mentioned, composite samples were composed of sediment from adjacent DMMUs. For the most part, the pairing of cores involved adjacent DMMUs, but this was not always the case. Composite sample pairing is indicated in Table 2 (e.g., core POV-01 was composited with POV-02).

3.4 FIELD DOCUMENTATION

Field documentation included a field log, sediment core log sheets, a sample log sheet, cross-section worksheets, chain-of-custody forms, and digital photographs of each core. The field log was used to record general information, including sampling dates, sample depths, sample positions and other observations.

A sediment core log was maintained throughout the sampling event to record information pertaining to each core. The log includes station ID, core number, time, location coordinates, and depth to the mud line as measured using a weighted fiberglass tape measure and adjusted for the river stage at the time of sampling. Observations of core material in each core were also recorded at the time of core processing, including layer depths, color, sediment type, type and amount of any debris observed in the sample, and any anomalies worthy of note (e.g., odors, staining, etc). Sediment core log sheets are presented in Appendix B.

For reference, digital photographs were taken of the entire length of every sediment core; photographs are on file with Parametrix.

4. SAMPLE HANDLING PROCEDURES

Sample handling procedures were followed to ensure sample integrity between the time of collection and the time that laboratory analysis begins. These procedures included sample storage, chain-of-custody, and sample delivery.

4.1 SAMPLE STORAGE

All sediment samples were placed in sample jars, then the jars were placed on ice in a cooler until receipt by the analytical laboratory. Immediately prior to shipment to the lab, each cooler was taped shut and equipped with a signed custody seal. Upon sample receipt, the laboratories noted compliance with storage temperatures and custody procedures. No sample handling issues were noted as part of this project. Chemical analyses were done as soon as possible after sample collection; deviations from specified holding times are discussed in Section 5.3.

4.2 CHAIN-OF-CUSTODY PROCEDURES

Chain-of-custody procedures documented the transfer of all samples from the Field Operations Coordinator to the analytical laboratories. Triplicate chain-of-custody (COC) forms were used to record each sample container, sample collection dates and times, the project name, the number of sample containers, and prescribed analyses. Sample containers were delivered to the laboratory via courier or by Parametrix personnel (on the last day of each sampling week). The Field Operations Coordinator retained one copy of each COC form; copies of these are included in Appendix B.

5. LABORATORY ANALYTICAL METHODS

Laboratory analysis was conducted by Severn Trent Laboratories – Seattle (STL), and included physical and chemical analysis as specified in Section 2. In order to meet required analytical data turnaround times, a portion of the sediment samples for which grain size analyses were to be conducted was sub-contracted to Analytical Resources Incorporated (ARI), located in Tukwila, Washington.

Results of sample analysis are presented in Section 7.

5.1 CHEMICAL ANALYSIS

Sediment samples were analyzed as specified in Table 8-1 of the DMEF and as indicated in Table 1 of this report. As mentioned, archived material representing discrete core intervals and the NSM is currently archived at the lab.

5.2 PHYSICAL ANALYSIS

Grain size and other conventional sediment parameter analyses were conducted for each composite sample submitted to the lab (27 samples). Similarly, archived material representing discrete core intervals and the NSM is in storage at the lab.

5.3 LABORATORY CORRECTIVE ACTIONS

Corrective actions were required as part of sample analysis during this project and are discussed below. It should be noted, however, that none of the issues encountered resulted in the rejection of any of the data. Nonetheless, the issues are discussed separately below.

- 1) During preparation of samples for the analysis of interstitial tributyltin (TBT), laboratory personnel were unable to extract a supernatant from the sampling containers after centrifuging. This difficulty was attributed to the dense nature of the sediment (predominantly sand) and a lack of pore water. Hence, the lab was unable to do an analysis for interstitial TBT. As a result, it was decided that bulk sediment analysis of TBT would be an acceptable alternative. Subsequent conversation with regulatory personnel (USACE) confirmed that this approach was acceptable. In fact, for coarse-grained material, the bulk sediment analysis is actually preferred (as stated in the Interim Final Sediment Evaluation Framework, September 2006). However, the bulk sediment TBT analysis was not performed until after the holding time had expired. Nonetheless, the results are presented herein with the appropriate flag; none of the data were rejected.
- 2) Laboratory error during sample preparation and analysis of benzoic acid, a miscellaneous extractable reported as part of the 8270 method, resulted in method detection limits (MDL) that exceed the DMEF sediment quality screening level of 650 µg/kg. Data received from the lab typically provided a MDL for benzoic acid around 900 µg/kg. Although, none of the sample results actually indicated the detection of benzoic acid, re-analysis for benzoic acid at appropriate MDLs (<100 µg/kg) was conducted at a rate of 10 percent (3 samples); samples were selected from the archived discrete samples and were chosen based on their location within the dredge prism; one sample each was selected from the downstream, middle, and upstream portions of the dredge prism. Results of the follow-up analyses indicated benzoic acid concentrations of 89, 99 and 100 µg/kg, well

below the DMEF screening level. Laboratory data reports for the follow-up analyses are included in Appendix C.

- 3) Upon receipt of the final data packages, it was noted that the lab had failed to conduct total organic carbon (TOC) analysis for 3 of the 26 samples submitted (POV-2530, -2732, and -4344). However, given the highly homogenous nature of the sediments throughout the dredge prism and the low levels of TOC observed in samples analyzed (undetected in several samples), the existing weight of evidence compensates for this minor data gap.

6. QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

Quality assurance and quality control (QA/QC) procedures are discussed in detail in the analytical protocols for each chemical. The recommended frequency of specific quality control procedures and associated control limits are summarized in published sediment sampling and analysis guidance (PTI and McFarland 1995).

6.1 QA/QC FOR CHEMICAL ANALYSES

Quality control procedures for chemical analyses included analytical instrument calibration, sample holding times, blank analyses to identify potential sample contamination in the laboratory, duplicate analyses to test analytical precision, and analyses of spikes and standards to test analytical accuracy.

6.2 DATA QUALITY ASSURANCE REVIEW

In addition to the quality control reviews provided by STL, the Project QA Manager conducted a quality assurance review. Data were subjected to a QA1-type review, using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for guidance. Data qualifiers were applied where necessary, based on the reviewer's judgment and experience. Data review for each analysis included evaluation of the following (where appropriate):

- Chain-of-custody documentation
- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS) recoveries;
- Matrix spike/spike duplicate (MS/MSD) recoveries; and
- Laboratory sample or spike replicate results and relative percent differences (RPDs).

The data packages submitted by STL and ARI were sufficient for this review. They included case narrative summaries of the work performed and any problems encountered during analysis, copies of the chain-of-custody forms, summary sample results, calibration data, raw analytical data, and summary QC results.

As determined by the review, samples tested by STL and ARI were analyzed within recommended technical holding times, with exceptions noted, and following appropriate methods and procedures. The bulk sediment TBT analysis was performed outside the recommended holding time, as were some of the total sulfides, TOC, and total volatile solids analyses. Nevertheless, the analytical accuracy and precision were generally acceptable, as demonstrated by the results of the laboratory QC analyses. Although some data were qualified due to out of control QC results, and organotin data was qualified due to holding time exceedances, no data were rejected based on this review. All data reported are considered valid, representative of the samples, and acceptable for further use. Data QA/QC summaries for each sample delivery group are included in Appendix C.

7. SEDIMENT DATA RESULTS

7.1 GENERAL PHYSICAL CHARACTERISTICS

Length of sediment samples (core recovery) ranged from 6.1 ft to 10.0 ft, with an average recovery of 8.1 ft. On average the sediment observed was composed of 95 percent sand (41 percent medium, 26 percent fine, 19 percent coarse), with fines comprising approximately 1 percent of the samples. The percentage of fines in a majority of samples was less than 1 percent. The average total organic carbon (TOC) was approximately 0.12 percent. Table 3 presents the grain size, TOC, and total solids data.

Visual observation of the sediment cores indicated that the sediment was highly homogenous. Typically, the only discernible change in sediment characteristics was a gradational change in the grain size of the sand. Of the 52 cores collected, silt (fines) was observed in only 4 cores, in isolated lenses approximating 4 to 6 inches in thickness.

7.2 ANALYSIS OF SEDIMENT CHEMISTRY DATA

Table 4 lists the dry weight chemical concentrations measured for all analytes. Data qualifiers attached to chemical concentrations are discussed in the “Checklist for Data Validation” memos included in Appendix A. Method detection limits are reported for undetected analytes, with the “U” symbol to indicate that the chemical was not detected. The following documents and their respective sediment quality criteria were used in assessing the sediment samples:

- *Dredged Material Evaluation Framework*, USACE 1998.
- Washington Department of Ecology, *Phase II Report: Development and Recommendations of SQVs for Freshwater Sediments in Washington State*, Table 3-3.
- National Oceanic and Atmospheric Administration *Screening Quick Reference Tables (SQuiRT)*, Freshwater Threshold Effects Levels (updated September 1999).
- *Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems*. MacDonald D.D., C.G. Ingersoll CG, and T. Berger. 2000.

For reference, these various criteria are included in Table 4. For criteria that apply to the sum of individual compounds, isomers, or groups of congeners (if detected), the sums and their applicable criteria are reported as recommended in published sediment sampling and analysis guidance (PTI and McFarland 1995). The following observations were made in comparing sample results to the above criteria.

7.3 PROJECT-SPECIFIC RESULTS AND DISCUSSION

There were no exceedances of analyte criteria in any of the samples collected from the Port of Vancouver Gateway Expansion dredge prism.

Sediment sample core logs show that the sediment material to be dredged and the NSM consist primarily of fine to coarse sand (95 percent, on average) with an average total organic carbon content of 0.12 percent. Fines (silt) were observed in only 4 of the 52 sediment cores collected, and in small amounts (4-6 inch lenses).

8. REFERENCES

- Parametrix. 2005. Draft – Sediment Sampling and Analysis Plan, Port of Vancouver, Vessel Approach and Turning Basin Dredging Project. October 2005.
- MacDonald D.D., C.G. Ingersoll CG, and T. Berger. Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems. 2000.
- PTI and McFarland. 1995. Draft Sediment Sampling and Analysis Plan Appendix: Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC). Prepared by PTI Environmental Services. Revisions by B. McFarland. Washington Department of Ecology, Sediment Management Unit. Olympia, Washington. December 1995.
- USACE (U.S. Army Corps of Engineers). Dredged Material Evaluation Framework, Lower Columbia River Management Area. November 1998.
- USACE. Northwest Regional Sediment Evaluation Framework, Interim Final. September 2006.
- Washington Department of Ecology, Phase II Report: Development and Recommendations of SQVs for Freshwater Sediments in Washington State, September 2003.

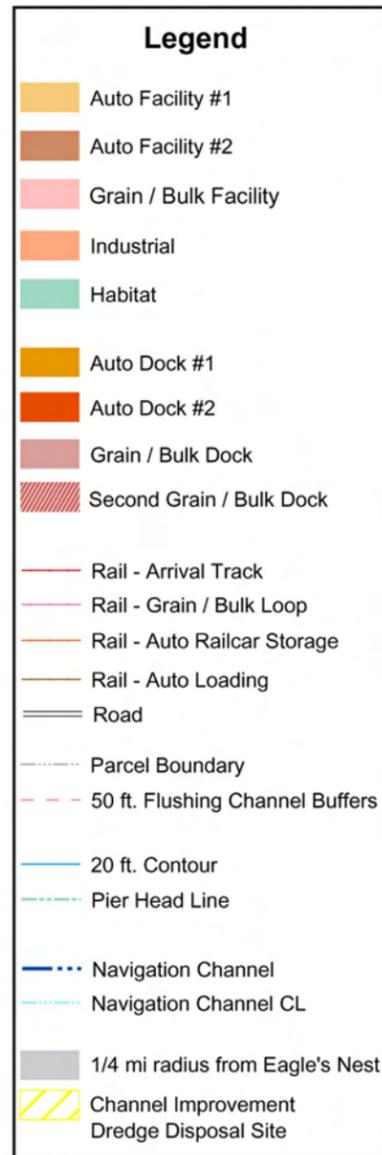
FIGURES



**Figure 1-1
Port of Vancouver
Vessel Approach and Turning Basin**

Columbia Gateway

Preferred Alternative Parcel 3 Detail Plan



All information is subject to survey verification
Produced December 10, 2003
Prepared for: Port of Vancouver
Prepared by: PB Ports & Marine

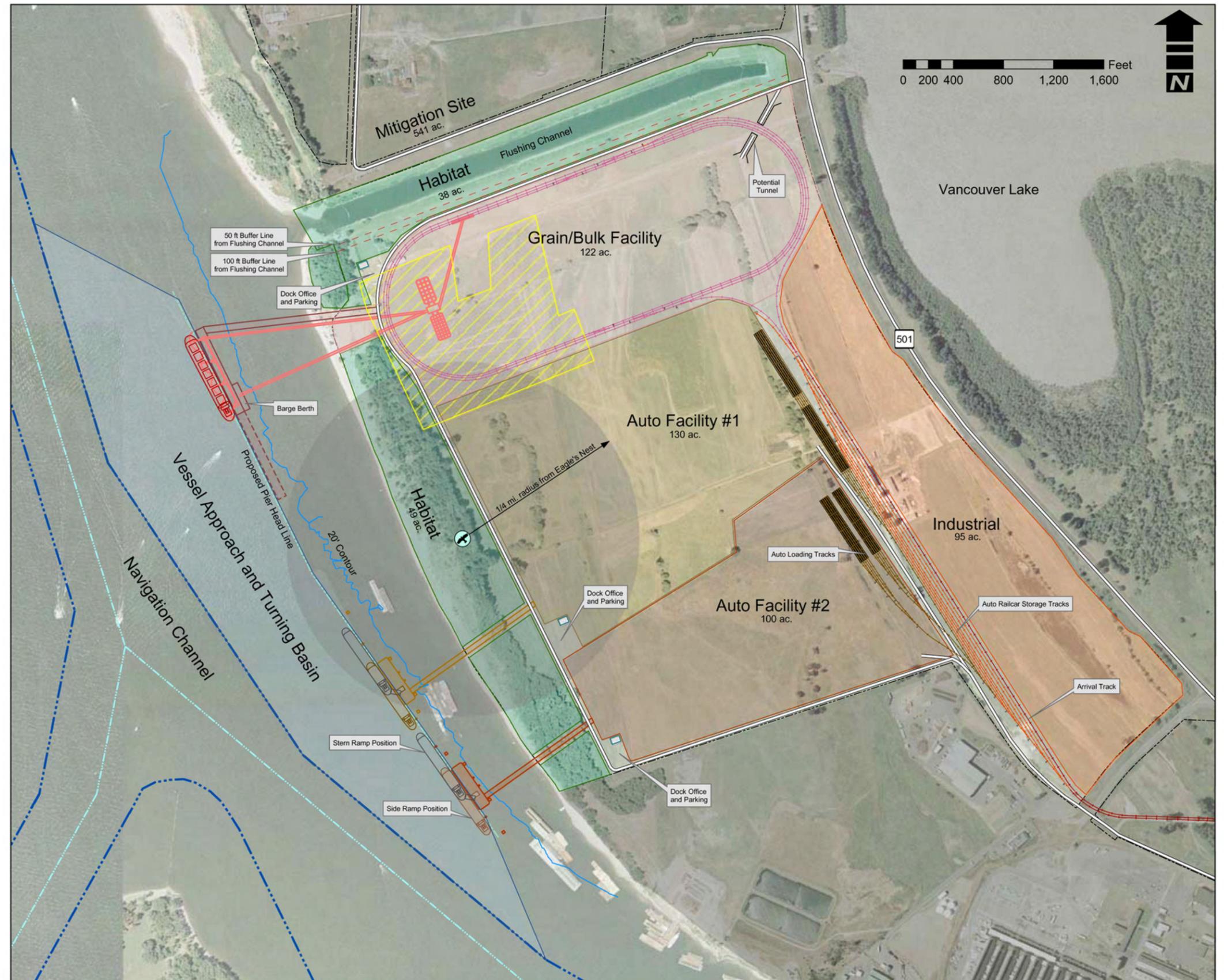
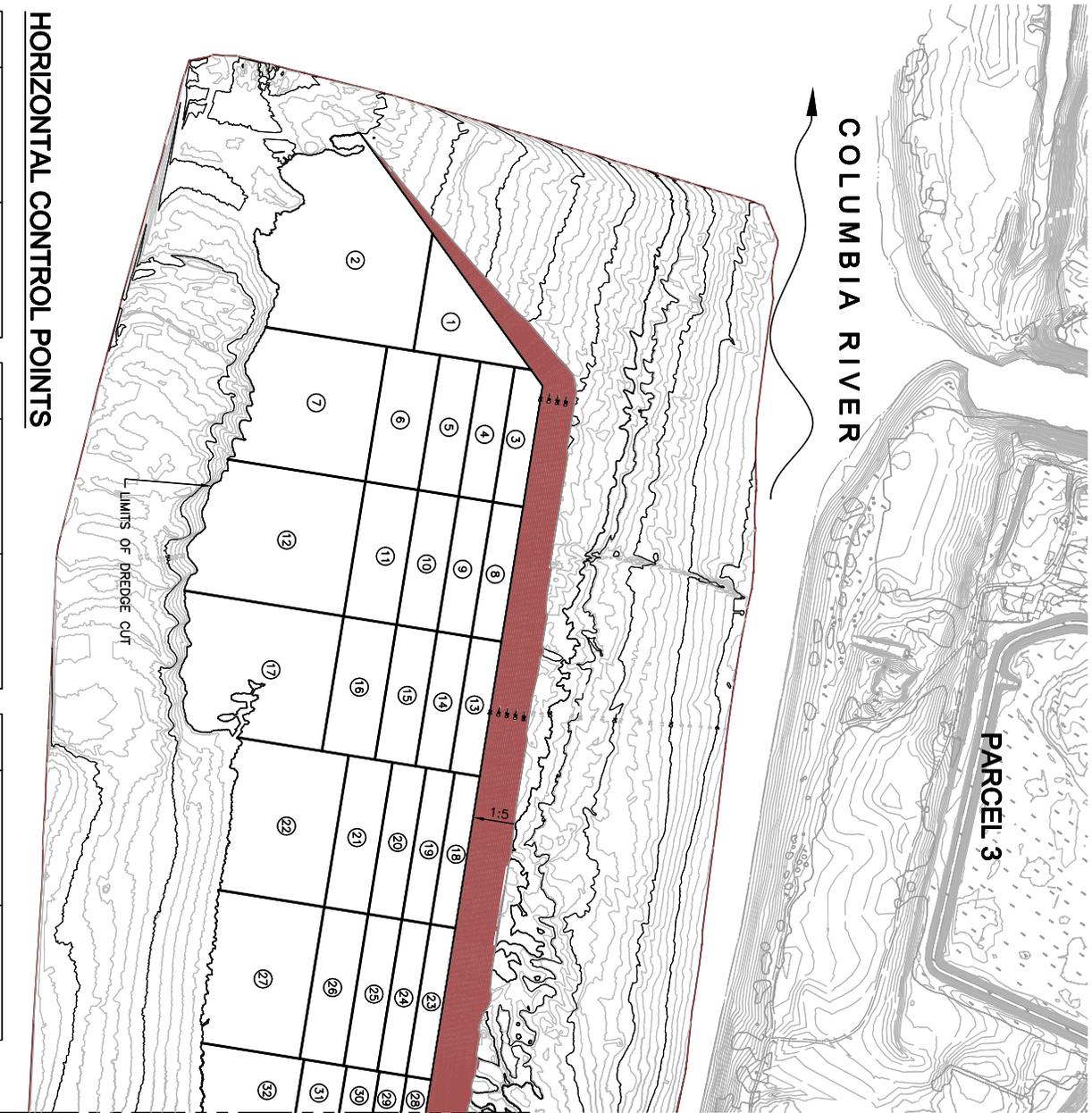


Figure 1-2
Port of Vancouver
Columbia Gateway Detail Plan



HORIZONTAL CONTROL POINTS

| UNIT | NORTHING | EASTING |
|------|-------------|--------------|
| ① | N 128645.11 | E 1061600.15 |
| ② | N 128630.93 | E 1061267.56 |
| ③ | N 128473.68 | E 1061953.89 |
| ④ | N 128433.24 | E 1061871.46 |
| ⑤ | N 128389.60 | E 1061774.03 |
| ⑥ | N 128324.96 | E 1061645.23 |
| ⑦ | N 128223.84 | E 1061415.43 |
| ⑧ | N 128116.82 | E 1062133.68 |
| ⑨ | N 128073.69 | E 1062047.07 |

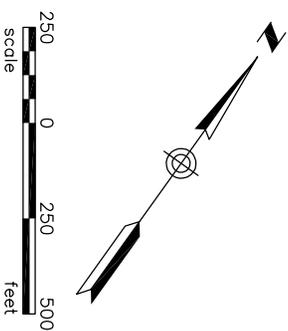
| UNIT | NORTHING | EASTING |
|------|-------------|--------------|
| ⑩ | N 128025.08 | E 1061952.05 |
| ⑪ | N 128630.93 | E 1061840.53 |
| ⑫ | N 127845.64 | E 1061576.98 |
| ⑬ | N 127769.22 | E 1062305.15 |
| ⑭ | N 127722.45 | E 1062224.71 |
| ⑮ | N 127676.08 | E 1062127.93 |
| ⑯ | N 127617.01 | E 1061999.64 |
| ⑰ | N 127508.54 | E 1061758.80 |
| ⑱ | N 127380.90 | E 1062513.81 |

| UNIT | NORTHING | EASTING |
|------|-------------|--------------|
| ⑲ | N 127345.68 | E 1062441.47 |
| ⑳ | N 127310.37 | E 1062354.31 |
| ㉑ | N 127253.21 | E 1062248.76 |
| ㉒ | N 127161.13 | E 1062060.37 |
| ㉓ | N 126986.08 | E 1062704.65 |
| ㉔ | N 126949.29 | E 1062631.91 |
| ㉕ | N 128907.65 | E 1062554.38 |
| ㉖ | N 126853.02 | E 1062444.37 |
| ㉗ | N 126756.13 | E 1062263.31 |

- NOTE:
1. DREDGED MATERIAL MANAGEMENT LIMITS (DMML) EXTEND TO A DEPTH OF 48 FEET BELOW COLUMBIA RIVER DATUM (CRD).
 2. ALL DMML HAVE APPROXIMATE EQUAL VOLUME.

SURVEY CONTROL:
 HORIZONTAL DATUM : WASHINGTON STATE PLANE SOUTH
 VERTICAL DATUM: COLUMBIA RIVER DATUM

MATCH LINE SEE FIGURE 1-3B



700 NE MULTNOMAH ST, SUITE 900
 PORTLAND, OREGON
 97232-4189
 VOICE: (503)731-6041
 FAX: (503)731-8902

BERGER/ABAM
 ENGINEERING INC.

A/E PROJECT NUMBER: PAPOR-05-099

DRAWING SCALE:
AS SHOWN
 DRAWN BY:
CBD
 APPROVED BY:
 DATE:
14-AUG-06

REVISIONS
 NO. DATE

PORT OF VANCOUVER
COLUMBIA GATEWAY
CONCEPTUAL PARCEL 3
DREDGE SAMPLING PLAN

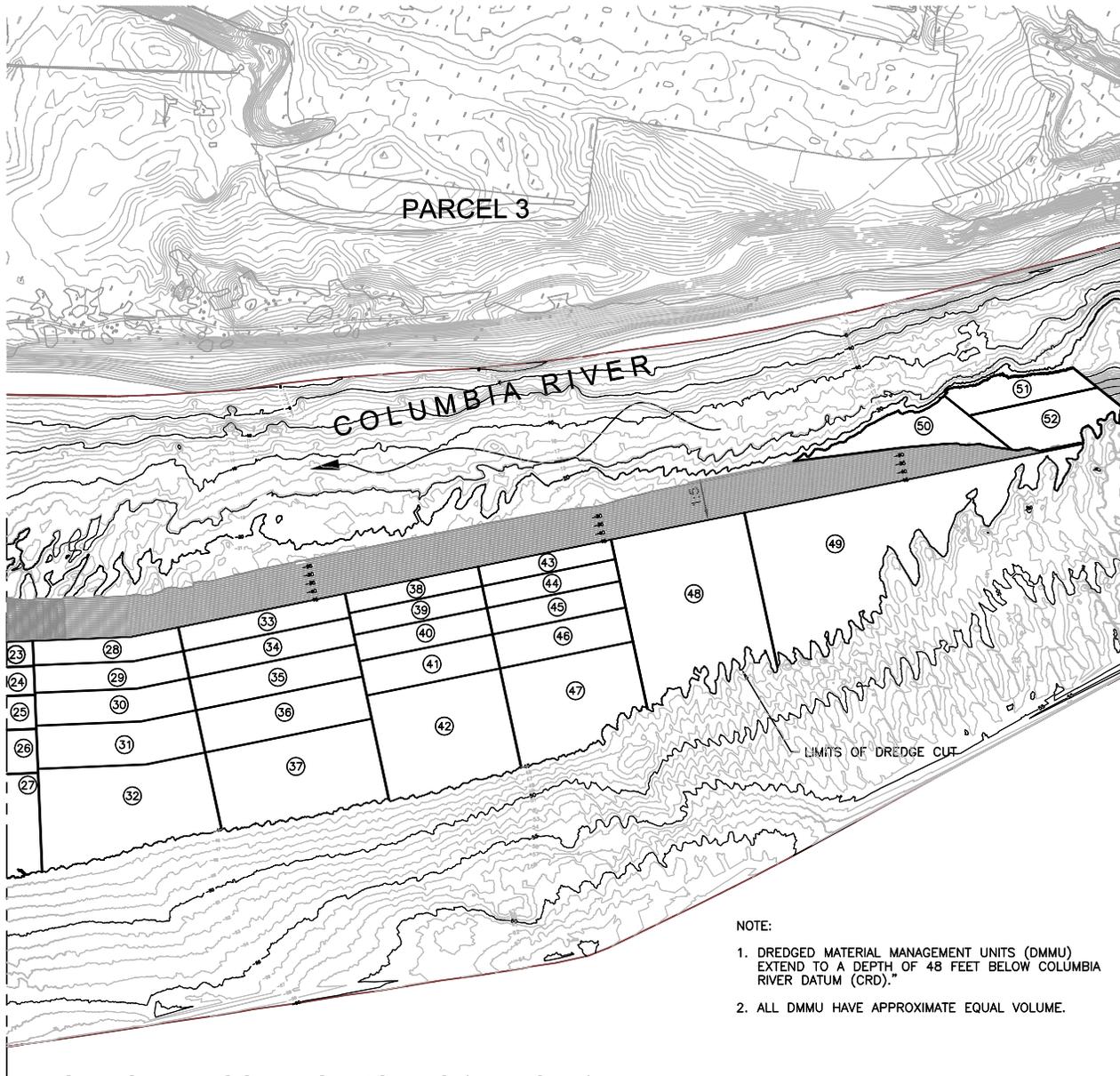
PORT OF VANCOUVER U.S.A.

3103 N.W. LOWER RIVER ROAD
 VANCOUVER, WA 98660-1027
 (360) 693-3611 FAX (360) 735-1565

SHEET CONTENTS:
 SAP FIGURE

DRAWING NUMBER
FIG1-3A
 SHEET NUMBER | OF 2
 POV PROJECT NO.

MATCH LINE SEE FIGURE 1-3A



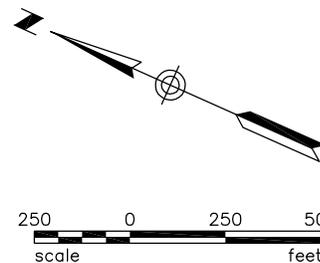
- NOTE:
1. DREDGED MATERIAL MANAGEMENT UNITS (DMMU) EXTEND TO A DEPTH OF 48 FEET BELOW COLUMBIA RIVER DATUM (CRD).
 2. ALL DMMU HAVE APPROXIMATE EQUAL VOLUME.

HORIZONTAL CONTROL POINTS (REVISED)

| UNIT | NORTHING | EASTING |
|------|-------------|--------------|
| 28 | N 126575.09 | E 1062906.91 |
| 29 | N 126528.35 | E 1062837.41 |
| 30 | N 126490.60 | E 1062766.38 |
| 31 | N 126428.90 | E 1062665.17 |
| 32 | N 126346.87 | E 1062536.54 |
| 33 | N 126190.94 | E 1063166.42 |
| 34 | N 126146.07 | E 1063104.44 |
| 35 | N 126096.42 | E 1063028.86 |
| 36 | N 126036.64 | E 1062942.76 |
| 37 | N 125941.55 | E 1062810.40 |
| 38 | N 125829.26 | E 1063431.24 |
| 39 | N 125791.34 | E 1063380.41 |
| 40 | N 125750.94 | E 1063324.04 |

| UNIT | NORTHING | EASTING |
|------|-------------|--------------|
| 41 | N 125693.28 | E 1063250.42 |
| 42 | N 125581.37 | E 1063101.68 |
| 43 | N 125506.23 | E 1063659.23 |
| 44 | N 125469.67 | E 1063608.54 |
| 45 | N 125427.66 | E 1063550.72 |
| 46 | N 125377.56 | E 1063479.72 |
| 47 | N 125278.56 | E 1063347.21 |
| 48 | N 125075.22 | E 1063749.70 |
| 49 | N 124754.36 | E 1064051.81 |
| 50 | N 124656.11 | E 1064475.11 |
| 51 | N 124435.42 | E 1064691.83 |
| 52 | N 124322.60 | E 1064645.57 |

SURVEY CONTROL:
 HORIZONTAL DATUM : WASHINGTON STATE PLANE SOUTH
 VERTICAL DATUM: COLUMBIA RIVER DATUM



700 NE MULTNOMAH ST, SUITE 900
 PORTLAND, OREGON
 97232-4189
 VOICE: (503)731-6041
 FAX: (503)731-6902

A/E PROJECT NUMBER: **PAFOR-05-0939**

DRAWING SCALE:
AS SHOWN
 DRAWN BY:
CBD
 APPROVED BY:

 DATE:
08-SEP-06

REVISIONS

| NO. | DATE |
|-----|------|
| | |
| | |
| | |
| | |

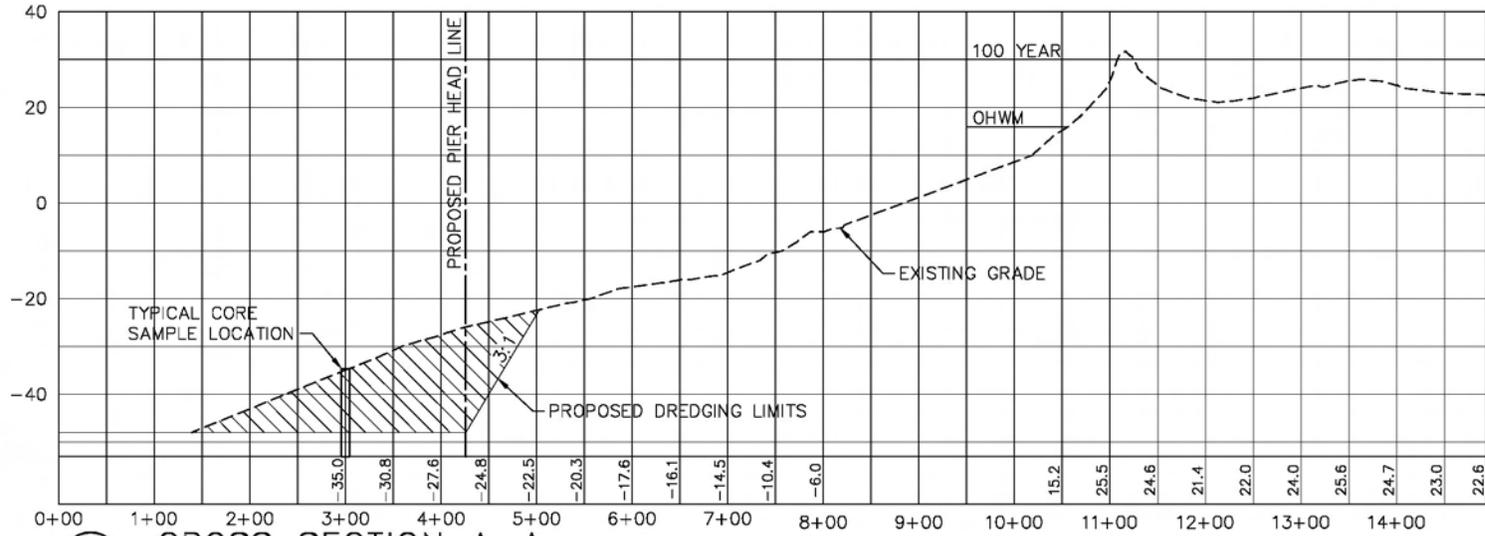
**PORT OF VANCOUVER
 COLUMBIA GATEWAY
 CONCEPTUAL PARCEL 3
 DREDGE SAMPLING PLAN**

3103 N.W. LOWER RIVER ROAD
 VANCOUVER, WA 98660-1027
 (360) 693-3611 FAX (360) 735-1565

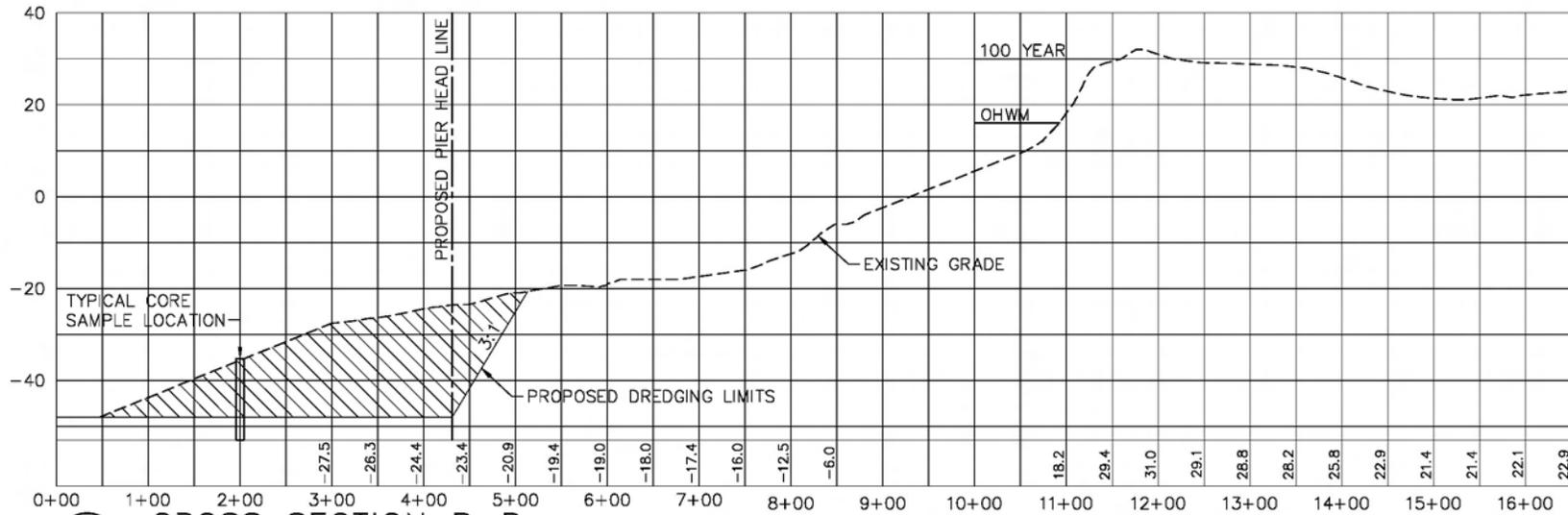
SHEET CONTENTS:
SAP FIGURE
REV. HORIZONTAL
CONTROL POINTS

DRAWING NUMBER
FIG1-3B

SHEET NUMBER **2** OF **2**
 POV PROJECT NO:



NOTE:
STRUCTURES NOT
SHOWN FOR CLARITY



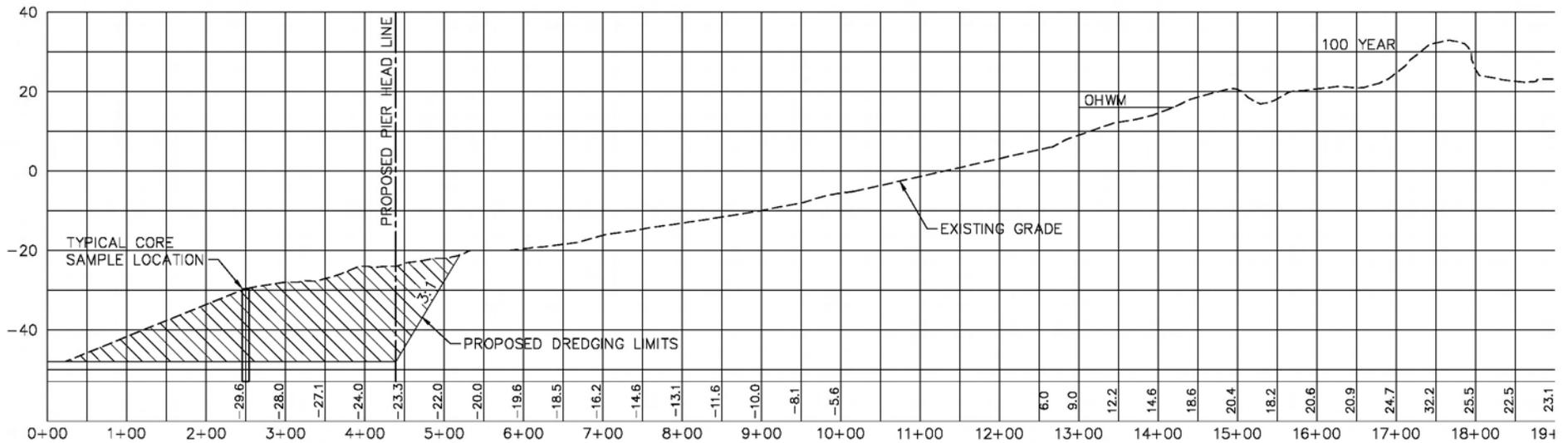
BERGER/ABAM
 ENGINEERS IN C.
 830 NE HOLLADAY ST, SUITE 140
 PORTLAND, OREGON
 97232-2107
 VOICE: (503)731-6041
 FAX: (503)731-8902

PORT OF VANCOUVER - COLUMBIA GATEWAY NEPA SUPPORT

FIGURE 1-4

AUTO DOCK DREDGING SECTIONS AND TYPICAL CORE SAMPLE LOCATION

DRAWN BY: T. NGUYEN
 DESIGNED BY: M. EDBERG
 CHECKED BY: M. EDBERG
 DATE: 09/02/2005
 SHEET: 4 OF 5



1 CROSS SECTION C-C
 C05 SCALE: HORZ: 1"=200' VERT: 1"=40'

NOTE:
 STRUCTURES NOT
 SHOWN FOR CLARITY

BERGER/ABAM
 ENGINEERS IN C.
 830 NE HOLLADAY ST, SUITE 140
 PORTLAND, OREGON
 97232-2107
 VOICE: (503)731-6041
 FAX: (503)731-8902

PORT OF VANCOUVER - COLUMBIA GATEWAY NEPA SUPPORT
 FIGURE 1-5
 AUTO DOCK DREDGING SECTION AND TYPICAL CORE SAMPLE LOCATION

DRAWN BY: T. NGUYEN
 DESIGNED BY: M. EDBERG
 CHECKED BY: M. EDBERG
 DATE: 09/02/2005
 SHEET: 5 OF 5

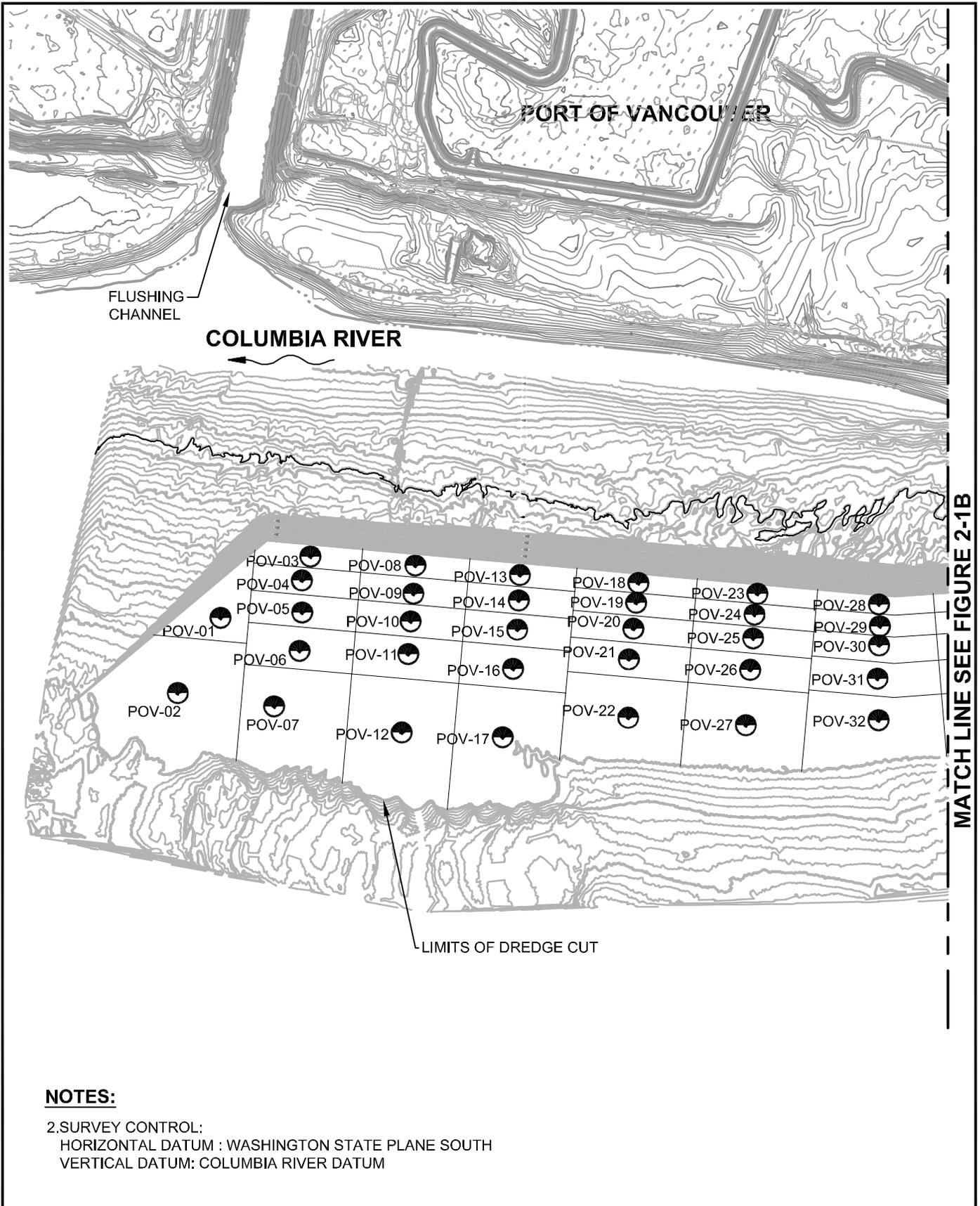
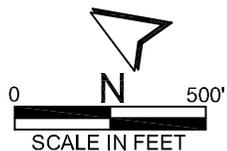
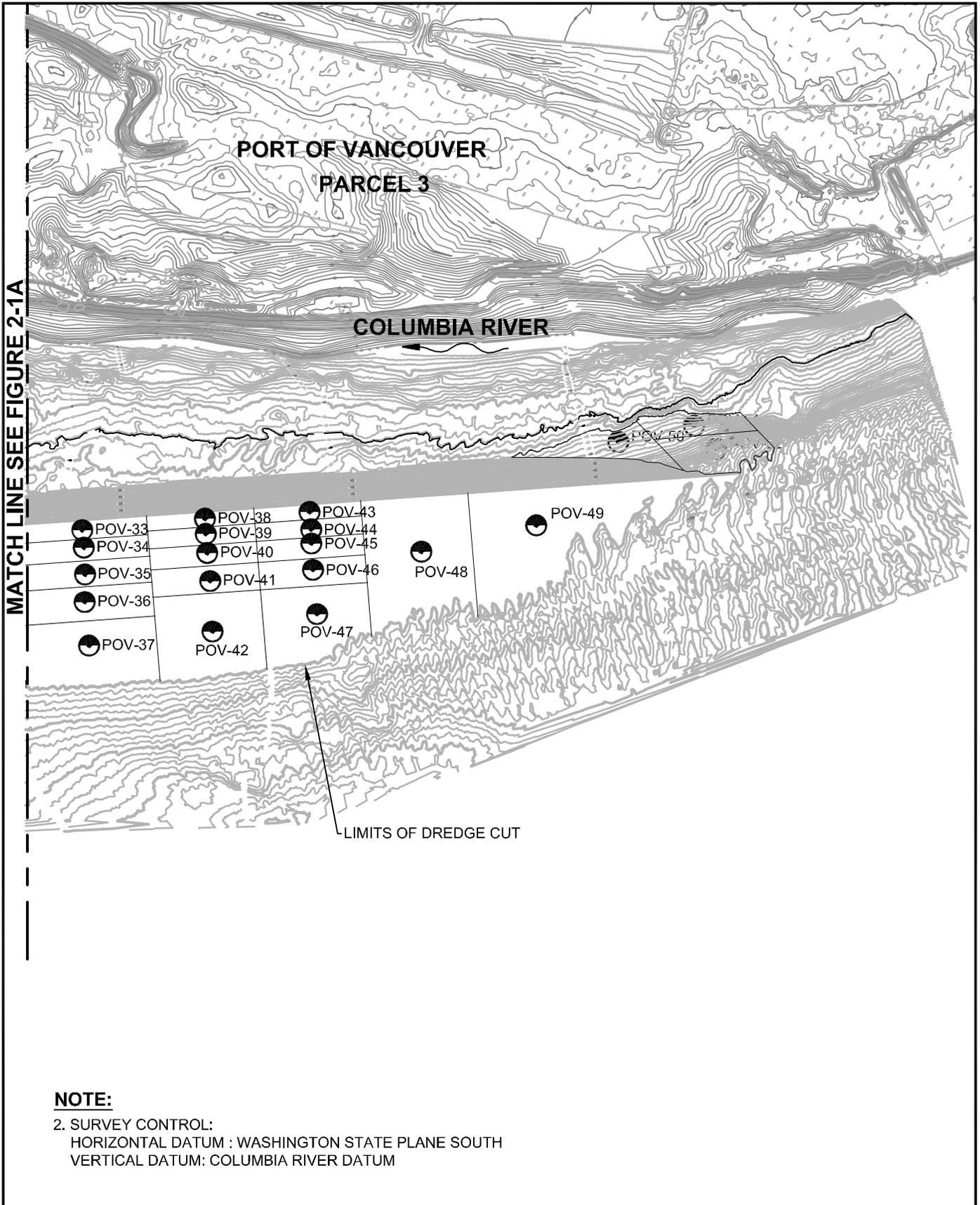


Figure 2-1A
Actual Sediment Sampling Locations
Port of Vancouver-Gateway Expansion
Vessel Approach and Turning Basin Project



**Figure 2-1B
Actual Sediment Sampling Locations
Port of Vancouver-Gateway Expansion
Vessel Approach and Turning Basin Project**

TABLES

**Table 1
Port of Vancouver
Sediment Analytes**

| | |
|--|---|
| <u>Conventional Parameters</u> Ammonia (mg/kg) Total Solids (%) Total Volatile Solids (%) Total Organic Carbon (%) Total Sulfides (mg/kg) Grain Size | <u>Metals (mg/kg)</u> Antimony Arsenic Cadmium Chromium Copper Lead Mercury (ug/kg) Nickel Silver Zinc |
| <u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u> 2-Methylnaphthalene Acenaphthene Acenaphthylene Anthracene Fluorene Naphthalene Phenanthrene Total LPAH Benzo[a]anthracene Benzo[a]pyrene Benzo[g,h,i]perylene Benzofluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Indeno[1,2,3-cd]pyrene Pyrene Total HPAH | <u>Organotins (ug/kg, bulk)</u> Dibutyltin Monobutyltin Tetra-n-butyltin Tributyltin (bulk) Triphenyltin |
| <u>Chlorinated Hydrocarbons (ug/kg)</u> 1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene Hexachlorobenzene | <u>Miscellaneous Extractables (ug/kg)</u> Benzoic acid Benzyl alcohol Dibenzofuran Hexachlorobutadiene N-Nitrosodiphenylamine |
| <u>Phthalates (ug/kg)</u> Bis(2-ethylhexyl) phthalate Butyl benzyl phthalate Diethyl phthalate Dimethyl phthalate Di-n-butyl phthalate Di-n-octyl phthalate | <u>Pesticides (ug/kg)</u> 4,4'-DDD 4,4'-DDE 4,4'-DDT Total DDT Aldrin alpha-Chlordane Dieldrin gamma-BHC (Lindane) Heptachlor |
| <u>Phenols (ug/kg)</u> 2,4-Dimethylphenol 2-Methylphenol 3 & 4 Methylphenol Pentachlorophenol Phenol | <u>Polychlorinated biphenyls (mg/kg)</u> PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260 Total PCBs |

Notes: List of compounds taken from Table 8-1 of the Dredged Material Evaluation Framework

**Table 2
Sediment Sampling Locations**

| Station ID | Latitude | Longitude | Mudline Elevation (CRD) | Core Recovery (ft) | Depth of Penetration (CRD) | Composite Pair | NSM Encountered? |
|------------|----------|------------|-------------------------|--------------------|----------------------------|----------------|------------------|
| POV-01 | 45.66332 | -122.76407 | -37.31 | 8.4 | -45.71 | POV-02 | |
| POV-02 | 45.66327 | -122.76533 | -46.34 | 8.8 | -55.14 | POV-01 | yes |
| POV-03 | 45.66289 | -122.76261 | -29.52 | 7.4 | -36.92 | POV-08 | |
| POV-04 | 45.66283 | -122.76297 | -34.07 | 7.5 | -41.57 | POV-09 | |
| POV-05 | 45.66265 | -122.76336 | -38.19 | 8.4 | -46.59 | POV-10 | |
| POV-06 | 45.66246 | -122.76385 | -40.03 | 7.7 | -47.73 | POV-11 | |
| POV-07 | 45.66237 | -122.76473 | -44.87 | 8.4 | -53.27 | POV-12 | yes |
| POV-08 | 45.66194 | -122.76189 | -29.36 | 7.5 | -36.86 | POV-03 | |
| POV-09 | 45.66180 | -122.76225 | -35.98 | 8.2 | -44.18 | POV-04 | |
| POV-10 | 45.66167 | -122.76261 | -34.8 | 7.5 | -42.3 | POV-05 | |
| POV-11 | 45.66151 | -122.76303 | -34.21 | 7.9 | -42.11 | POV-06 | |
| POV-12 | 45.66113 | -122.76404 | -47.37 | 6.1 | -53.47 | POV-07 | yes |
| POV-13 | 45.66099 | -122.76118 | -31.1 | 9.1 | -40.2 | POV-18 | |
| POV-14 | 45.66086 | -122.76150 | -32.9 | 8.8 | -41.7 | POV-19 | |
| POV-15 | 45.66071 | -122.76187 | -34.38 | 9.4 | -43.78 | POV-20 | |
| POV-16 | 45.66053 | -122.76238 | -38.52 | 6.9 | -45.42 | POV-21 | |
| POV-17 | 45.66024 | -122.76330 | -45.98 | 6.6 | -52.58 | POV-22 | yes |
| POV-18 | 45.65993 | -122.76034 | -28.23 | 7.9 | -36.13 | POV-13 | |
| POV-19 | 45.65984 | -122.76060 | -31.17 | 7.5 | -38.67 | POV-14 | |
| POV-20 | 45.65972 | -122.76094 | -33.31 | 7.3 | -40.61 | POV-15 | |
| POV-21 | 45.65959 | -122.76135 | -37 | 7.4 | -44.4 | POV-16 | |
| POV-22 | 45.65927 | -122.76207 | -43.01 | 8.7 | -51.71 | POV-17 | yes |
| POV-23 | 45.65885 | -122.75953 | -25.95 | 8.6 | -34.55 | POV-28 | |
| POV-24 | 45.65876 | -122.75981 | -28.91 | 7.4 | -36.31 | POV-29 | |
| POV-25 | 45.65864 | -122.76011 | -30.48 | 8.2 | -38.68 | POV-30 | |
| POV-26 | 45.65849 | -122.76052 | -36.25 | 8.2 | -44.45 | POV-31 | |
| POV-27 | 45.65822 | -122.76123 | -42.68 | 8 | -50.68 | POV-32 | yes |
| POV-28 | 45.65775 | -122.75870 | -26.42 | 7.4 | -33.82 | POV-23 | |
| POV-29 | 45.65762 | -122.75896 | -29.35 | 7.4 | -36.75 | POV-24 | |
| POV-30 | 45.65752 | -122.75920 | -33.21 | 8.1 | -41.31 | POV-25 | |
| POV-31 | 45.65735 | -122.75962 | -36.05 | 8.6 | -44.65 | POV-26 | |
| POV-32 | 45.65711 | -122.76012 | -41.27 | 7.7 | -48.97 | POV-27 | yes |
| POV-33 | 45.65672 | -122.75765 | -26.62 | 8.6 | -35.22 | POV-38 | |
| POV-34 | 45.65661 | -122.75785 | -27.57 | 8.2 | -35.77 | POV-39 | |
| POV-35 | 45.65645 | -122.75817 | -31.54 | 7.3 | -38.84 | POV-40 | |
| POV-36 | 45.65630 | -122.75851 | -34.88 | 8.6 | -43.48 | POV-41 | |
| POV-37 | 45.65602 | -122.75901 | -39.36 | 10 | -49.36 | POV-42 | yes |
| POV-38 | 45.65573 | -122.75654 | -27.18 | 9.1 | -36.28 | POV-33 | |
| POV-39 | 45.65564 | -122.75672 | -28.35 | 6.5 | -34.85 | POV-34 | |
| POV-40 | 45.65552 | -122.75694 | -31.09 | 7.3 | -38.39 | POV-35 | |
| POV-41 | 45.65534 | -122.75726 | -34.34 | 9.1 | -43.44 | POV-36 | |
| POV-42 | 45.65504 | -122.75786 | -39.78 | 8.9 | -48.68 | POV-37 | yes |
| POV-43 | 45.65487 | -122.75563 | -28.77 | 8.9 | -37.67 | POV-44 | |
| POV-44 | 45.65476 | -122.75583 | -29.99 | 6.8 | -36.79 | POV-43 | |
| POV-45 | 45.65468 | -122.75600 | -30.85 | 8.3 | -39.15 | POV-46 | |
| POV-46 | 45.65452 | -122.75631 | -34.72 | 9 | -43.72 | POV-45 | |
| POV-47 | 45.65424 | -122.75682 | -41.01 | 8.9 | -49.91 | POV-48 | yes |
| POV-48 | 45.65369 | -122.75523 | -36.85 | 8.8 | -45.65 | POV-47 | |

Table 2
Sediment Sampling Locations

| | | | | | | | |
|--------|----------|------------|--------|-----|--------|--------|-----|
| POV-49 | 45.65285 | -122.75400 | -40.4 | 8 | -48.4 | POV-52 | yes |
| POV-50 | 45.65261 | -122.75233 | -29.07 | 8 | -37.07 | POV-51 | |
| POV-51 | 45.65205 | -122.75153 | -26.82 | 8 | -34.82 | POV-50 | |
| POV-52 | 45.65173 | -122.75164 | -38.54 | 7.6 | -46.14 | POV-49 | |

Table 3
Port of Vancouver
Grain Size, Total Organic Carbon, and Total Solids

| Sample | | | Grain Size (percent retained) | | | | | | | | | | | | |
|-----------------|----------------|--------------|-------------------------------|------------------|-------------|-------------|-------------|----------------|--------------------------|-------------|-------------|--------------|----------------|-------------|-------------|
| | | | Gravel | Very Coarse Sand | Coarse Sand | Medium Sand | Fine Sand | Very Fine Sand | Total Sand (% of solids) | Coarse Silt | Medium Silt | Fine Silt | Very Fine Silt | Clay | Total Fines |
| | % Total Solids | % TOC | #10 | #18 | #35 | #60 | #120 | #230 | - | (62.5 - 31) | (31 - 15.6) | (15.6 - 7.8) | (7.8 - 3.9) | (3.9 - 1.0) | <230 |
| POV-0102 | 87.0 | .0502 U | 1.6 | 2.6 | 13.7 | 24.3 | 54.8 | 0.8 | 96.2 | 2.1 | NA | NA | 0.1 | 0.8 | 3.0 |
| POV-0308 | 86.9 | .0503 U | 2.6 | 2.7 | 15.5 | 20.7 | 54.3 | 3.3 | 96.5 | NA | NA | 0.6 | NA | 0.1 | 0.7 |
| POV-0409 | 82.3 | 0.097 J | 4.3 | 12.9 | 24.1 | 37.3 | 19.2 | 1.7 | 95.2 | NA | NA | NA | NA | NA | 0.6 |
| POV-0510 | 93.4 | 0.067 J | 4.0 | 7.0 | 15.7 | 49.4 | 21.7 | 1.3 | 95.1 | NA | NA | NA | NA | NA | 0.9 |
| POV-0611 | 85.9 | .0503 U | 1.8 | 3.6 | 16.0 | 28.4 | 46.8 | 1.8 | 96.6 | 1.6 | 0.5 | NA | 0.1 | 1.2 | 3.4 |
| POV-0712 | 82.5 | .0502 U | 0.8 | 8.7 | 29.7 | 41.3 | 15.1 | 2.1 | 96.9 | NA | NA | NA | NA | NA | 1.0 |
| POV-1318 | 79.6 | 0.344 J | 4.1 | 11.1 | 21.9 | 40.9 | 19.6 | 1.9 | 95.4 | NA | NA | NA | NA | NA | 0.6 |
| POV-1419 | 80.4 | 0.066 J | 4.0 | 12.6 | 22.1 | 38.2 | 20.4 | 1.7 | 95.0 | NA | NA | NA | NA | NA | 0.9 |
| POV-1520 | 80.8 | 0.055 J | 2.5 | 9.1 | 23.1 | 44.7 | 18.6 | 1.3 | 96.8 | NA | NA | NA | NA | NA | 0.7 |
| POV-1621 | 74.9 | 0.094 J | 4.1 | 9.6 | 19.7 | 47.1 | 17.3 | 1.2 | 94.9 | NA | NA | NA | NA | NA | 0.9 |
| POV-1722 | 79.9 | .0503 U | 0.6 | 2.0 | 13.7 | 21.8 | 60.3 | 0.6 | 98.4 | NA | NA | NA | NA | NA | 1.5 |
| POV-2328 | 73.1 | 0.158 J | 3.9 | 7.2 | 16.9 | 47.7 | 22.5 | 1.4 | 95.7 | NA | NA | NA | NA | NA | 0.5 |
| POV-2429 | 78.4 | 0.142 J | 2.9 | 7.9 | 17.5 | 48.3 | 20.1 | 1.8 | 95.6 | NA | NA | NA | NA | NA | 1.4 |
| POV-2530 | 74.3 | nm | 2.4 | 9.0 | 23.0 | 44.6 | 18.5 | 1.2 | 96.5 | NA | NA | NA | NA | NA | 1.1 |
| POV-2631 | 92.5 | 0.050 J | 3.9 | 8.0 | 16.6 | 46.8 | 23.0 | 1.5 | 95.9 | NA | NA | NA | NA | NA | 0.4 |
| POV-2732 | 79.2 | nm | 4.1 | 8.2 | 16.8 | 47.0 | 22.2 | 1.7 | 95.9 | NA | NA | NA | NA | NA | 0.8 |
| POV-3338 | 87.5 | 0.208 J | 1.7 | 5.1 | 13.2 | 49.2 | 28.7 | 1.9 | 98.1 | NA | NA | NA | NA | NA | 0.2 |
| POV-3439 | 79.8 | 0.179 J | 5.8 | 10.6 | 18.5 | 44.2 | 18.9 | 1.2 | 93.4 | NA | NA | NA | NA | NA | 0.9 |
| POV-3540 | 83.2 | 0.084 J | 7.1 | 10.3 | 16.0 | 45.9 | 18.6 | 1.3 | 92.1 | NA | NA | NA | NA | NA | 0.8 |
| POV-3641 | 89.6 | 0.126 J | 5.0 | 8.4 | 14.2 | 45.5 | 25.0 | 1.5 | 94.6 | NA | NA | NA | NA | NA | 0.4 |
| POV-3742 | 82.8 | .0502 U | 3.9 | 3.5 | 14.3 | 19.2 | 56.7 | 0.9 | 94.6 | NA | NA | NA | NA | NA | 2.4 |
| POV-4344 | 80.7 | nm | 4.0 | 10.1 | 21.6 | 41.7 | 18.7 | 2.0 | 94.1 | NA | NA | NA | NA | NA | 1.6 |
| POV-4546 | 83.6 | 0.111 J | 4.1 | 9.2 | 18.0 | 46.7 | 20.0 | 1.1 | 95.0 | NA | NA | NA | NA | NA | 0.9 |
| POV-4748 | 81.2 | 0.0504 U | 2.4 | 5.1 | 11.4 | 46.8 | 28.0 | 3.7 | 95.0 | NA | NA | NA | NA | NA | 1.7 |
| POV-4952 | 77.2 | 0.061 J | 2.3 | 6.0 | 16.4 | 49.1 | 24.2 | 1.6 | 97.3 | NA | NA | NA | NA | NA | 0.5 |
| POV-5051 | 78.2 | 0.091 J | 7.7 | 13.2 | 26.8 | 38.3 | 12.4 | 0.8 | 91.5 | NA | NA | NA | NA | NA | 0.7 |
| Averages | 81.9 | 0.121 | 3.6 | 8.0 | 18.5 | 41.2 | 26.0 | 1.6 | 95.4 | NA | NA | NA | NA | NA | 1.0 |

Notes: nm = not measured

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | | |
|--|--------------------------------------|---------------------------------------|--------|-------------------------|--------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|------|--------|------|--------|----|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-0102 | POV-0308 | POV-0409 | POV-0510 | POV-0611 | POV-0712 | POV-1318 | POV-1419 | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/13/06 | 10/12/06 | 10/12/06 | 10/12/06 | 10/13/06 | 10/13/06 | 10/18/06 | 10/18/06 | | | | | |
| Conventional Parameters | | | | | | | | | | | | | | | | | | | | | | | |
| Ammonia (mg/kg) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 16 | | 44 | | 23 | | 50 | | 16 | | 18 | | 18 | |
| Total Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 87 | | 88 | | 85 | | 84 | | 88 | | 78 | | 78 | |
| Total Volatile Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.74 | J | 0.93 | | 0.84 | | 1.0 | | 0.62 | J | 0.66 | J | 0.67 | J |
| Total Organic Carbon (%) ⁴ | -- | -- | -- | -- | -- | -- | 9.82 | -- | -- | 0.0502 | U | 0.0503 | U | 0.097 | J | 0.067 | J | 0.0503 | U | 0.0502 | U | 0.344 | J |
| Total Sulfides (mg/kg) | -- | -- | -- | -- | -- | -- | 702 | 941 | -- | 6.0 | UJ | 5.9 | UJ | 6.2 | UJ | 6.1 | UJ | 5.9 | UJ | 6.3 | UJ | 6.1 | UJ |
| Metals (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Antimony | -- | 150 | 200 | -- | -- | -- | 0.6 | 1.9 | -- | 0.069 | JB M | 0.09 | M | 0.085 | M | 0.081 | M | 0.038 | JB M | 0.074 | JB M | 0.084 | M |
| Arsenic | 57 | 57 | 700 | 20 | 20 | 5.9 | 31.4 | 50.9 | 33 | 1.3 | | 1.1 | | 0.89 | | 1 | | 1 | | 1.1 | | 0.98 | |
| Cadmium | 5.1 | 5.1 | 14 | 2 | 25 | 0.596 | 2.39 | 2.9 | 4.98 | 0.0039 | U | 0.0029 | U | 0.0043 | U | 0.0033 | U | 0.0042 | U | 0.0044 | U | 0.0044 | U |
| Chromium | 260 | -- | -- | 19 | 42 | 37.3 | 95 | 133 | 111 | 8.7 | | 9.1 | | 8.2 | | 8.3 | | 8.5 | | 10 | | 7.4 | |
| Copper | 390 | 390 | 1,300 | -- | 100 | 35.7 | 619 | 829 | 149 | 8.1 | | 7.1 | | 7.3 | | 6.9 | | 8.6 | | 8.7 | | 6.8 | |
| Lead | 450 | 450 | 1,200 | 1,000 | 220 | 35.0 | 335 | 431 | 128 | 1.8 | | 2 | | 1.5 | | 1.6 | | 1.7 | | 2 | | 1.5 | |
| Mercury | 0.41 | 0.41 | 2.3 | 2 | 9 | 0.174 | 0.8 | 3.04 | 1.06 | 0.0078 | U | 0.0087 | U | 0.0078 | U | 0.042 | | 0.02 | | 0.019 | M | 0.0071 | U |
| Nickel | -- | 140 | 370 | -- | 1000 | 18.0 | 53.1 | 113 | 48.6 | 9.8 | | 9.1 | | 7.8 | | 9.1 | | 9.3 | | 11 | | 7.4 | |
| Silver | 6.1 | 6.1 | 8.4 | -- | -- | -- | 0.545 | 3.5 | -- | 0.04 | M | 0.032 | M | 0.041 | M | 0.034 | M | 0.034 | M | 0.038 | M | 0.038 | M |
| Zinc | 410 | 410 | 3,800 | -- | 270 | 123.1 | 683 | 1080 | 459 | 24 | | 26 | | 20 | | 22 | | 24 | | 29 | | 19 | |
| Organotins (ug/kg, bulk) | | | | | | | | | | | | | | | | | | | | | | | |
| Dibutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.13 | UJ | 0.13 | UJ | 0.14 | UJ | 0.14 | UJ | 0.13 | UJ | 0.15 | UJ | 0.14 | UJ |
| Monobutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.08 | UJ | 0.082 | UJ | 0.084 | UJ | 0.087 | UJ | 0.081 | UJ | 0.089 | UJ | 0.088 | UJ |
| Tetra-n-butyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.4 | UJ | 0.41 | UJ | 0.43 | UJ | 0.44 | UJ | 0.41 | UJ | 0.45 | UJ | 0.45 | UJ |
| Tributyltin (bulk) | -- | 75 (SEF) | -- | -- | -- | -- | -- | -- | -- | 0.43 | UJ | 0.44 | UJ | 0.45 | UJ | 0.47 | UJ | 0.43 | UJ | 0.47 | UJ | 0.47 | UJ |
| Polynuclear Aromatic Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | 38 | 670 | 1,900 | -- | -- | -- | 469 | 555 | -- | 3.5 | U | 3.3 | U | 3.4 | U | 3.5 | U | 3.3 | U | 3.8 | U | 3.7 | U |
| Acenaphthene | 16 | 500 | 2,000 | -- | -- | -- | 1060 | 1320 | -- | 6.4 | U | 6.1 | U | 6.3 | U | 6.4 | U | 6.1 | U | 7 | U | 6.8 | U |
| Acenaphthylene | 66 | 560 | 1,300 | -- | -- | -- | 470 | 640 | -- | 2.6 | U | 2.5 | U | 2.6 | U | 2.6 | U | 2.5 | U | 2.8 | U | 2.8 | U |
| Anthracene | 220 | 960 | 13,000 | -- | -- | -- | 1230 | 1580 | 845 | 4.9 | U | 4.6 | U | 4.8 | U | 4.8 | U | 4.6 | U | 5.3 | U | 5.2 | U |
| Fluorene | 23 | 540 | 3,600 | -- | -- | -- | 1070 | 3850 | 536 | 2.9 | U | 2.8 | U | 2.9 | U | 2.9 | U | 2.8 | U | 3.2 | U | 3.1 | U |
| Naphthalene | 99 | 2,100 | 2,400 | 5,000 | -- | -- | 529 | 1310 | 561 | 6.4 | U | 6.1 | U | 6.3 | U | 6.4 | U | 6.1 | U | 7 | U | 6.8 | U |
| Phenanthrene | 100 | 1,500 | 21,000 | -- | 30,000 | 41.9 | 6,100 | 7,570 | 1170 | 4.5 | U | 4.3 | U | 4.4 | U | 4.5 | U | 4.3 | U | 4.9 | U | 4.8 | U |
| Total LPAH | 370 | 5,200 | 29,000 | -- | -- | -- | 6590 | 9200 | -- | | | | | | | | | | | | | | |
| Benzo[a]anthracene | 110 | 1,300 | 5,100 | -- | -- | 31.7 | 4260 | 5800 | 1050 | 7.3 | U | 6.9 | U | 7.2 | U | 7.3 | U | 6.9 | U | 8 | U | 7.8 | U |
| Benzo[a]pyrene | 99 | 1,600 | 3,600 | 2,000 | -- | 31.9 | 3300 | 4810 | 1450 | 9.6 | U | 9.1 | U | 9.4 | U | 9.5 | U | 9.1 | U | 10 | U | 10 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 3,200 | -- | -- | -- | 4020 | 5200 | -- | 8.2 | U | 7.8 | U | 8.1 | U | 8.2 | U | 7.8 | U | 9 | U | 8.8 | U |
| Benzo[fluoranthene (b + k) | 230 | 3,200 | 9,900 | -- | -- | -- | 11000 | 13800 | -- | 11 | U | 11 | U | 11 | U | 11 | U | 11 | U | 12 | U | 12 | U |
| Chrysene | 110 | 1,400 | 21,000 | -- | -- | 57.1 | 5940 | 6400 | 1290 | 8.5 | U | 8 | U | 8.3 | U | 8.4 | U | 8 | U | 9.3 | U | 9 | U |
| Dibenzo(a,h)anthracene | 12 | 230 | 1,900 | -- | -- | -- | 800 | 839 | -- | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 15 | U | 14 | U |
| Fluoranthene | 160 | 1,700 | 30,000 | -- | -- | 111 | 11100 | 15000 | 2230 | 3.5 | U | 3.3 | U | 3.4 | U | 3.5 | U | 3.3 | U | 3.8 | U | 3.7 | U |
| Indeno[1,2,3-cd]pyrene | 34 | 600 | 16,000 | -- | -- | -- | 4120 | 5300 | -- | 14 | U | 13 | U | 13 | U | 13 | U | 13 | U | 15 | U | 14 | U |
| Pyrene | 1,000 | 2,600 | 16,000 | -- | -- | 53 | 8790 | 16000 | 1520 | 3 | U | 2.9 | U | 3 | U | 3 | U | 2.9 | U | 3.3 | U | 3.2 | U |
| Total HPAH | 960 | 12,000 | 69,000 | -- | -- | -- | 31640 | 54800 | -- | | | | | | | | | | | | | | |
| Chlorinated Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 64 | -- | -- | -- | -- | -- | -- | 11 | U | 11 | U | 11 | U | 11 | U | 11 | U | 12 | U | 12 | U |
| 1,2-Dichlorobenzene | 2.3 | 35 | 110 | -- | -- | -- | -- | -- | -- | 19 | U | 18 | U | 19 | U | 19 | U | 18 | U | 21 | U | 20 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 120 | -- | -- | -- | -- | -- | -- | 8.6 | U | 8.1 | U | 8.4 | U | 8.5 | U | 8.1 | U | 9.4 | U | 9.1 | U |
| Hexachlorobenzene | 0.38 | 22 | 230 | -- | -- | -- | -- | -- | -- | 0.19 | U | 0.19 | U | 0.2 | U | 0.21 | U | 0.19 | U | 0.22 | U | 0.17 | U |

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | | | | |
|---|--------------------------------------|---------------------------------------|-------|-------------------------|---------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----|--------|----|--------|---|--------|----|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-0102 | POV-0308 | POV-0409 | POV-0510 | POV-0611 | POV-0712 | POV-1318 | POV-1419 | | | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/13/06 | 10/12/06 | 10/12/06 | 10/12/06 | 10/13/06 | 10/13/06 | 10/18/06 | 10/18/06 | | | | | | | |
| Phthalates (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bis(2-ethylhexyl) phthalate | 47 | 8,300 | -- | -- | -- | -- | 2520 | 6380 | -- | 270 | U | 260 | U | 270 | U | 270 | U | 260 | U | 300 | U | 290 | U | 290 | U |
| Butyl benzyl phthalate | 4.9 | 970 | -- | -- | -- | -- | 260 | 366 | -- | 33 | U | 31 | U | 32 | U | 33 | U | 31 | U | 36 | U | 35 | U | 35 | U |
| Diethyl phthalate | 61 | 1,200 | -- | -- | -- | -- | -- | -- | -- | 8.1 | UJ | 7.7 | U | 8 | U | 8.1 | U | 7.7 | UJ | 8.9 | UJ | 8.6 | U | 8.7 | U |
| Dimethyl phthalate | 53 | 1,400 | -- | -- | -- | -- | 311 | 436 | -- | 8.7 | U | 8.2 | U | 8.6 | U | 8.6 | U | 8.2 | U | 9.5 | U | 9.2 | U | 9.3 | U |
| Di-n-butyl phthalate | 220 | 5,100 | -- | -- | 200,000 | -- | 103 | -- | -- | 15 | U | 37 | JB M | 14 | U | 15 | U | 14 | U | 16 | U | 16 | U | 16 | U |
| Di-n-octyl phthalate | 58 | 6,200 | -- | -- | -- | -- | 11 | 201 | -- | 37 | U | 35 | U | 37 | U | 37 | U | 35 | U | 41 | U | 40 | U | 40 | U |
| Phenols (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2,4-Dimethylphenol | 29 | 29 | 210 | -- | -- | -- | -- | -- | -- | 21 | U | 20 | U | 21 | U | 21 | U | 20 | U | 23 | U | 23 | U | 23 | U |
| 2-Methylphenol | 63 | 63 | 77 | -- | -- | -- | -- | -- | -- | 32 | U | 30 | U | 31 | U | 31 | U | 30 | U | 35 | U | 34 | U | 34 | U |
| 3 & 4 Methylphenol | 670 | 670 | 3,600 | -- | -- | -- | 760 | 2360 | -- | 60 | U | 56 | U | 59 | U | 59 | U | 56 | U | 65 | U | 64 | U | 64 | U |
| Pentachlorophenol | 360 | 400 | 690 | -- | 11,000 | -- | -- | -- | -- | 35 | U | 33 | U | 34 | U | 35 | U | 33 | U | 38 | U | 37 | U | 38 | U |
| Phenol | 420 | 420 | 1,200 | -- | -- | -- | -- | -- | -- | 30 | U | 29 | U | 30 | U | 30 | U | 29 | U | 33 | U | 32 | U | 33 | U |
| Miscellaneous Extractables (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzoic acid | 650 | 650 | 760 | -- | -- | -- | 2910 | 3790 | -- | 940 | U | 880 | U | 920 | U | 930 | U | 880 | U | 1000 | U | 1000 | U | 1000 | U |
| Benzyl alcohol | 57 | 57 | 870 | -- | -- | -- | -- | -- | -- | 34 | U | 32 | U | 33 | U | 34 | U | 32 | U | 37 | U | 36 | U | 36 | U |
| Dibenzofuran | 15 | 540 | 1,700 | -- | -- | -- | 399 | 443 | -- | 19 | U | 18 | U | 19 | U | 19 | U | 18 | U | 21 | U | 20 | U | 21 | U |
| Hexachlorobutadiene | 3.9 | 29 | 270 | -- | -- | -- | -- | -- | -- | 0.11 | U | 0.12 | U | 0.12 | U | 0.13 | U | 0.12 | U | 0.13 | U | 0.1 | U | 0.11 | UJ |
| N-Nitrosodiphenylamine | 11 | 28 | 130 | -- | -- | -- | -- | -- | -- | 17 | UJ | 16 | U | 17 | U | 17 | U | 16 | UJ | 19 | UJ | 18 | U | 18 | U |
| Pesticides (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4,4'-DDD | -- | -- | -- | -- | -- | 3.54 | 96 | -- | 28.0 | 0.28 | U | 0.29 | U | 0.29 | U | 0.31 | U | 0.29 | U | 0.33 | U | 0.25 | U | 0.27 | UJ |
| 4,4'-DDE | -- | -- | -- | -- | -- | 1.42 | 21 | -- | 31.3 | 0.24 | U | 0.24 | U | 0.25 | U | 0.27 | U | 0.24 | U | 0.28 | U | 0.21 | U | 0.23 | UJ |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | 19 | -- | 62.9 | 0.28 | U | 0.28 | U | 0.29 | U | 0.31 | U | 0.28 | U | 0.33 | U | 0.25 | U | 0.26 | UJ |
| Total DDT | -- | 6.9 | 69 | 4,000 | 1,000 | 6.98 | -- | -- | 572 | | | | | | | | | | | | | | | | |
| Aldrin | -- | 10 | -- | -- | 170 | -- | -- | -- | -- | 0.11 | U | 0.12 | U | 0.12 | U | 0.13 | U | 0.12 | U | 0.13 | U | 0.1 | U | 0.11 | UJ |
| alpha-Chlordane | -- | 10 | -- | -- | 1,000 | 4.5 | -- | -- | 17.6 | 0.13 | U | 0.13 | U | 0.13 | U | 0.14 | U | 0.13 | U | 0.15 | U | 0.11 | U | 0.12 | UJ |
| Dieldrin | -- | 10 | -- | -- | 170 | 2.85 | -- | -- | 61.8 | 0.23 | U | 0.24 | U | 0.24 | U | 0.26 | U | 0.24 | U | 0.28 | U | 0.21 | U | 0.22 | UJ |
| gamma-BHC (Lindane) | -- | 10 | -- | 10 | -- | 0.94 | -- | -- | 4.99 | 0.12 | U | 0.13 | U | 0.13 | U | 0.14 | U | 0.13 | U | 0.15 | U | 0.11 | U | 0.12 | UJ |
| Heptachlor | -- | 10 | -- | -- | -- | 0.6 | -- | -- | 16.0 | 0.14 | U | 0.14 | U | 0.15 | U | 0.16 | U | 0.14 | U | 0.17 | U | 0.13 | U | 0.13 | UJ |
| Polychlorinated biphenyls (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCB-1016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | UJ | 0.0065 | U | 0.0066 | U | 0.0067 | U | 0.0061 | UJ | 0.007 | UJ | 0.0073 | U | 0.0071 | U |
| PCB-1221 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0066 | U | 0.0067 | U | 0.0061 | U | 0.007 | U | 0.0073 | U | 0.0071 | U |
| PCB-1232 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0066 | U | 0.0067 | U | 0.0061 | U | 0.007 | U | 0.0073 | U | 0.0071 | U |
| PCB-1242 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0066 | U | 0.0067 | U | 0.0061 | U | 0.007 | U | 0.0073 | U | 0.0071 | U |
| PCB-1248 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0066 | U | 0.0067 | U | 0.0061 | U | 0.007 | U | 0.0073 | U | 0.0071 | U |
| PCB-1254 | -- | -- | -- | -- | -- | -- | 230 | 294 | -- | 0.0017 | U | 0.0017 | U | 0.0017 | U | 0.0017 | U | 0.0016 | U | 0.0018 | U | 0.0019 | U | 0.0018 | U |
| PCB-1260 | -- | -- | -- | -- | -- | -- | 138 | 140 | -- | 0.0017 | UJ | 0.0017 | U | 0.0017 | U | 0.0017 | U | 0.0016 | UJ | 0.0018 | UJ | 0.0019 | U | 0.0018 | U |
| Total PCBs | 12 | 0.13 | 3.1 | 10.0 | 2.0 | 0.0341 | 62 | 354 | 676 | | | | | | | | | | | | | | | | |

Notes:

-- Indicates no numerical criterion of this type for this chemical. nm = not measured

¹Sediment Management Standard (WAC 173-204)

²NOAA SQUIRT - NOAA Screening Quick Reference Tables, developed by the Coastal Protection & Restoration Division of NOAA

³MacDonald - Values obtained from *Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines*, EPA 905/R-00/007. June 2000

⁴Total organic carbon (TOC) analyzed via two different methods: STL used the PSEP Modified Lloyd-Kahn method; ARI used the Plumb, 1981 method.

SL = screening level. ML = maximum level

TEL = threshold effects level. LAET = Lowest Apparent Effects Threshold. 2LAET = Second Lowest Apparent Effects Threshold. PEC = probable effect concentration

U = compound analyzed but not detected above the reporting limit. H = sample analyzed outside holding time. J = estimated value. M = result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

B = analyte detected in sample and method blank (organics). Result reported is less than the reporting limit but greater than detection limit (inorganics)

* - duplicate sample analysis is not within control limits (inorganics)

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | |
|--|--------------------------------------|---------------------------------------|--------|-------------------------|--------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|------------|----------|--------------|----------|------------|----------|-----------|--|----------|--|----------|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-1520 | POV-1621 | POV-1722 | POV-2328 | POV-2328 DUP | POV-2429 | POV-2530 | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/17/06 | 10/17/06 | 10/16/06 | 10/19/06 | 10/19/06 | 10/19/06 | 10/18/06 | | | | | |
| Conventional Parameters | | | | | | | | | | | | | | | | | | | | | | |
| Ammonia (mg/kg) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 17 | | 17 | | 19 | | 17 | | 17 | | 18 | | 18 |
| Total Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 85 | | 84 | | 78 | | 82 | | 82 | | 78 | | 79 |
| Total Volatile Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.63 | | 0.6 | | 1.2 | | 0.63 | | 0.64 | | 0.63 | | 0.64 J |
| Total Organic Carbon (%) ⁴ | -- | -- | -- | -- | -- | -- | 9.82 | -- | -- | 0.055 J | | 0.094 J | | 0.0503 U | | 0.158 J | | 0.074 J | | 0.142 J | | nm |
| Total Sulfides (mg/kg) | -- | -- | -- | -- | -- | -- | 702 | 941 | -- | 6.0 UJ | | 6.0 UJ | | 6.8 UJ | | 6.8 UJ | | 6.2 UJ | | 6.0 UJ | | 6.3 UJ |
| Metals (mg/kg) | | | | | | | | | | | | | | | | | | | | | | |
| Antimony | -- | 150 | 200 | -- | -- | -- | 0.6 | 1.9 | -- | 0.055 JB M | | 0.069 JB M | | 0.042 JB M | | 0.091 JB M | | 0.13 JB M | | 0.1 JB M | | 0.17 M |
| Arsenic | 57 | 57 | 700 | 20 | 20 | 5.9 | 31.4 | 50.9 | 33 | 1.3 | | 1.3 | | 2 | | 1.2 | | 1.1 | | 1.5 | | 1.2 |
| Cadmium | 5.1 | 5.1 | 14 | 2 | 25 | 0.596 | 2.39 | 2.9 | 4.98 | 0.0042 U | | 0.0043 U | | 0.0043 U | | 0.0045 U | | 0.0041 U | | 0.0046 U | | 0.0045 U |
| Chromium | 260 | -- | -- | 19 | 42 | 37.3 | 95 | 133 | 111 | 7.2 | | 7.9 | | 11 | | 7.4 | | 8.5 | | 8.6 | | 6.9 |
| Copper | 390 | 390 | 1,300 | -- | 100 | 35.7 | 619 | 829 | 149 | 7.3 | | 6.4 | | 9.2 | | 6.7 | | 7.2 | | 7.7 | | 7 |
| Lead | 450 | 450 | 1,200 | 1,000 | 220 | 35.0 | 335 | 431 | 128 | 1.7 | | 1.7 | | 2 | | 2 | | 2 | | 2.3 | | 1.7 |
| Mercury | 0.41 | 0.41 | 2.3 | 2 | 9 | 0.174 | 0.8 | 3.04 | 1.06 | 0.0076 U | | 0.0086 U | | 0.0083 U | | 0.0077 U | | 0.0071 U | | 0.0091 U | | 0.0094 U |
| Nickel | -- | 140 | 370 | -- | 1000 | 18.0 | 53.1 | 113 | 48.6 | 9.3 | | 8.3 | | 11 | | 8 | | 8 | | 9.5 | | 7.2 |
| Silver | 6.1 | 6.1 | 8.4 | -- | -- | -- | 0.545 | 3.5 | -- | 0.03 M | | 0.027 M | | 0.048 M | | 0.035 M | | 0.041 M | | 0.044 M | | 0.049 M |
| Zinc | 410 | 410 | 3,800 | -- | 270 | 123.1 | 683 | 1080 | 459 | 22 | | 22 | | 30 | | 25 | | 27 | | 27 | | 23 |
| Organotins (ug/kg, bulk) | | | | | | | | | | | | | | | | | | | | | | |
| Dibutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.14 UJ | | 0.14 UJ | | 0.15 UJ | | 0.15 UJ | | 0.14 UJ | | 0.15 UJ | | 0.15 UJ |
| Monobutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.085 UJ | | 0.083 UJ | | 0.089 UJ | | 0.088 UJ | | 0.086 UJ | | 0.093 UJ | | 0.091 UJ |
| Tetra-n-butyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.43 UJ | | 0.42 UJ | | 0.45 UJ | | 0.45 UJ | | 0.44 UJ | | 0.47 UJ | | 0.46 UJ |
| Tributyltin (bulk) | -- | 75 (SEF) | -- | -- | -- | -- | -- | -- | -- | 0.46 UJ | | 0.44 UJ | | 0.47 UJ | | 0.47 UJ | | 0.46 UJ | | 0.49 UJ | | 0.49 UJ |
| Polynuclear Aromatic Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | 38 | 670 | 1,900 | -- | -- | -- | 469 | 555 | -- | 3.2 U | | 3.6 U | | 3.8 U | | 3.5 U | | 3.7 U | | 3.9 U | | 3.7 U |
| Acenaphthene | 16 | 500 | 2,000 | -- | -- | -- | 1060 | 1320 | -- | 5.9 U | | 6.5 U | | 7 U | | 6.4 U | | 6.7 U | | 7.2 U | | 6.8 U |
| Acenaphthylene | 66 | 560 | 1,300 | -- | -- | -- | 470 | 640 | -- | 2.4 U | | 2.6 U | | 2.8 U | | 2.6 U | | 2.7 U | | 2.9 U | | 2.7 U |
| Anthracene | 220 | 960 | 13,000 | -- | -- | -- | 1230 | 1580 | 845 | 4.4 U | | 4.9 U | | 5.3 U | | 4.8 U | | 5.1 U | | 5.4 U | | 5.1 U |
| Fluorene | 23 | 540 | 3,600 | -- | -- | -- | 1070 | 3850 | 536 | 2.7 U | | 3 U | | 3.2 U | | 2.9 U | | 3.1 U | | 3.3 U | | 3.1 U |
| Naphthalene | 99 | 2,100 | 2,400 | 5,000 | -- | -- | 529 | 1310 | 561 | 5.9 U | | 6.5 U | | 7 U | | 6.4 U | | 6.7 U | | 7.2 U | | 6.8 U |
| Phenanthrene | 100 | 1,500 | 21,000 | -- | 30,000 | 41.9 | 6,100 | 7,570 | 1170 | 4.1 U | | 4.6 U | | 4.9 U | | 4.5 U | | 4.7 U | | 5.1 U | | 4.8 U |
| Total LPAH | 370 | 5,200 | 29,000 | -- | -- | -- | 6590 | 9200 | -- | | | | | | | | | | | | | |
| Benzo[a]anthracene | 110 | 1,300 | 5,100 | -- | -- | 31.7 | 4260 | 5800 | 1050 | 6.7 U | | 7.4 U | | 8 U | | 7.3 U | | 7.7 U | | 8.2 U | | 7.7 U |
| Benzo[a]pyrene | 99 | 1,600 | 3,600 | 2,000 | -- | 31.9 | 3300 | 4810 | 1450 | 8.7 U | | 9.7 U | | 10 U | | 9.6 U | | 10 U | | 11 U | | 10 U |
| Benzo[g,h,i]perylene | 31 | 670 | 3,200 | -- | -- | -- | 4020 | 5200 | -- | 7.5 U | | 8.4 U | | 9 U | | 8.2 U | | 8.6 U | | 9.2 U | | 8.7 U |
| Benzo[fluoranthene (b + k) | 230 | 3,200 | 9,900 | -- | -- | -- | 11000 | 13800 | -- | 10 U | | 11 U | | 12 U | | 11 U | | 12 U | | 13 U | | 12 U |
| Chrysene | 110 | 1,400 | 21,000 | -- | -- | 57.1 | 5940 | 6400 | 1290 | 7.7 U | | 8.6 U | | 9.2 U | | 8.4 U | | 8.9 U | | 9.5 U | | 8.9 U |
| Dibenzo(a,h)anthracene | 12 | 230 | 1,900 | -- | -- | -- | 800 | 839 | -- | 12 U | | 14 U | | 15 U | | 14 U | | 14 U | | 15 U | | 14 U |
| Fluoranthene | 160 | 1,700 | 30,000 | -- | -- | 111 | 11100 | 15000 | 2230 | 3.2 U | | 3.6 U | | 3.8 U | | 3.5 U | | 3.7 U | | 6.1 J M | | 3.7 U |
| Indeno[1,2,3-cd]pyrene | 34 | 600 | 16,000 | -- | -- | -- | 4120 | 5300 | -- | 12 U | | 14 U | | 15 U | | 14 U | | 14 U | | 15 U | | 14 U |
| Pyrene | 1,000 | 2,600 | 16,000 | -- | -- | 53 | 8790 | 16000 | 1520 | 2.8 U | | 3.1 U | | 3.3 U | | 3 U | | 3.2 U | | 7.6 J M | | 3.2 U |
| Total HPAH | 960 | 12,000 | 69,000 | -- | -- | -- | 31640 | 54800 | -- | | | | | | | | | | | | | |
| Chlorinated Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 64 | -- | -- | -- | -- | -- | -- | 10 U | | 11 U | | 12 U | | 11 U | | 12 U | | 13 U | | 12 U |
| 1,2-Dichlorobenzene | 2.3 | 35 | 110 | -- | -- | -- | -- | -- | -- | 17 U | | 19 U | | 21 U | | 19 U | | 20 U | | 21 U | | 20 U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 120 | -- | -- | -- | -- | -- | -- | 7.8 U | | 8.7 U | | 9.3 U | | 8.6 U | | 9 U | | 9.6 U | | 9.1 U |
| Hexachlorobenzene | 0.38 | 22 | 230 | -- | -- | -- | -- | -- | -- | 0.17 U | | 0.16 U | | 0.23 U | | 0.21 U | | 0.22 U | | 0.23 U | | 0.19 U |

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | | |
|---|--------------------------------------|---------------------------------------|-------|-------------------------|---------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|--------------|----------|----------|----------|--------|------|--------|------|--------|---|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-1520 | POV-1621 | POV-1722 | POV-2328 | POV-2328 DUP | POV-2429 | POV-2530 | | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/17/06 | 10/17/06 | 10/16/06 | 10/19/06 | 10/19/06 | 10/19/06 | 10/18/06 | | | | | | |
| Phthalates (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Bis(2-ethylhexyl) phthalate | 47 | 8,300 | -- | -- | -- | -- | 2520 | 6380 | -- | 250 | U | 270 | U | 300 | U | 270 | U | 280 | U | 300 | U | 290 | U |
| Butyl benzyl phthalate | 4.9 | 970 | -- | -- | -- | -- | 260 | 366 | -- | 30 | U | 33 | U | 36 | U | 33 | U | 34 | U | 37 | U | 35 | U |
| Diethyl phthalate | 61 | 1,200 | -- | -- | -- | -- | -- | -- | -- | 7.4 | U | 8.2 | U | 8.9 | UJ | 8.1 | U | 8.5 | U | 9.1 | U | 8.6 | U |
| Dimethyl phthalate | 53 | 1,400 | -- | -- | -- | -- | 311 | 436 | -- | 7.9 | U | 8.8 | U | 9.5 | U | 8.7 | U | 9.1 | U | 9.7 | U | 9.2 | U |
| Di-n-butyl phthalate | 220 | 5,100 | -- | -- | 200,000 | -- | 103 | -- | -- | 58 | JB M | 62 | JB M | 16 | U | 65 | JB M | 66 | JB M | 71 | JB M | 15 | U |
| Di-n-octyl phthalate | 58 | 6,200 | -- | -- | -- | -- | 11 | 201 | -- | 34 | U | 190 | M | 41 | U | 37 | U | 39 | U | 42 | U | 39 | U |
| Phenols (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 2,4-Dimethylphenol | 29 | 29 | 210 | -- | -- | -- | -- | -- | -- | 20 | U | 22 | U | 23 | U | 21 | U | 22 | U | 24 | U | 23 | U |
| 2-Methylphenol | 63 | 63 | 77 | -- | -- | -- | -- | -- | -- | 29 | U | 32 | U | 34 | U | 32 | U | 33 | U | 35 | U | 33 | U |
| 3 & 4 Methylphenol | 670 | 670 | 3,600 | -- | -- | -- | 760 | 2360 | -- | 55 | U | 61 | U | 65 | U | 60 | U | 63 | U | 67 | U | 63 | U |
| Pentachlorophenol | 360 | 400 | 690 | -- | 11,000 | -- | -- | -- | -- | 32 | U | 36 | U | 38 | U | 35 | U | 37 | U | 39 | U | 37 | U |
| Phenol | 420 | 420 | 1,200 | -- | -- | -- | -- | -- | -- | 28 | U | 31 | U | 33 | U | 30 | U | 32 | U | 34 | U | 32 | U |
| Miscellaneous Extractables (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Benzoic acid | 650 | 650 | 760 | -- | -- | -- | 2910 | 3790 | -- | 850 | U | 950 | U | 1000 | U | 940 | UJ | 980 | UJ | 1000 | UJ | 990 | U |
| Benzyl alcohol | 57 | 57 | 870 | -- | -- | -- | -- | -- | -- | 31 | U | 34 | U | 37 | U | 34 | U | 35 | U | 38 | U | 36 | U |
| Dibenzofuran | 15 | 540 | 1,700 | -- | -- | -- | 399 | 443 | -- | 17 | U | 19 | U | 21 | U | 19 | U | 20 | U | 21 | U | 20 | U |
| Hexachlorobutadiene | 3.9 | 29 | 270 | -- | -- | -- | -- | -- | -- | 0.1 | U | 0.097 | U | 0.13 | U | 0.12 | U | 0.13 | U | 0.14 | U | 0.11 | U |
| N-Nitrosodiphenylamine | 11 | 28 | 130 | -- | -- | -- | -- | -- | -- | 15 | UJ | 17 | UJ | 18 | UJ | 17 | U | 18 | U | 19 | U | 18 | U |
| Pesticides (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 4,4'-DDD | -- | -- | -- | -- | -- | 3.54 | 96 | -- | 28.0 | 0.25 | U | 0.24 | U | 0.33 | U | 0.31 | U | 0.33 | U | 0.34 | U | 0.27 | U |
| 4,4'-DDE | -- | -- | -- | -- | -- | 1.42 | 21 | -- | 31.3 | 0.21 | U | 0.21 | U | 0.29 | U | 0.26 | U | 0.28 | U | 0.29 | U | 0.23 | U |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | 19 | -- | 62.9 | 0.25 | U | 0.24 | U | 0.33 | U | 0.3 | U | 0.32 | U | 0.34 | U | 0.27 | U |
| Total DDT | -- | 6.9 | 69 | 4,000 | 1,000 | 6.98 | -- | -- | 572 | | | | | | | | | | | | | | |
| Aldrin | -- | 10 | -- | -- | 170 | -- | -- | -- | -- | 0.1 | U | 0.097 | U | 0.13 | U | 0.12 | U | 0.13 | U | 0.14 | U | 0.11 | U |
| alpha-Chlordane | -- | 10 | -- | -- | 1,000 | 4.5 | -- | -- | 17.6 | 0.11 | U | 0.22 | M | 0.15 | U | 0.14 | U | 0.15 | U | 0.15 | U | 0.12 | U |
| Dieldrin | -- | 10 | -- | -- | 170 | 2.85 | -- | -- | 61.8 | 0.21 | U | 0.2 | U | 0.28 | U | 0.25 | U | 0.27 | U | 0.28 | U | 0.23 | U |
| gamma-BHC (Lindane) | -- | 10 | -- | 10 | -- | 0.94 | -- | -- | 4.99 | 0.11 | U | 0.11 | U | 0.15 | U | 0.13 | U | 0.14 | U | 0.15 | U | 0.12 | U |
| Heptachlor | -- | 10 | -- | -- | -- | 0.6 | -- | -- | 16.0 | 0.13 | U | 0.12 | U | 0.17 | U | 0.15 | U | 0.16 | U | 0.17 | U | 0.14 | U |
| Polychlorinated biphenyls (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| PCB-1016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0062 | U | 0.0065 | U | 0.0072 | UJ | 0.007 | U | 0.0065 | U | 0.0074 | U | 0.007 | U |
| PCB-1221 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0062 | U | 0.0065 | U | 0.0072 | U | 0.007 | U | 0.0065 | U | 0.0074 | U | 0.007 | U |
| PCB-1232 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0062 | U | 0.0065 | U | 0.0072 | U | 0.007 | U | 0.0065 | U | 0.0074 | U | 0.007 | U |
| PCB-1242 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0062 | U | 0.0065 | U | 0.0072 | U | 0.007 | U | 0.0065 | U | 0.0074 | U | 0.007 | U |
| PCB-1248 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0062 | U | 0.0065 | U | 0.0072 | U | 0.007 | U | 0.0065 | U | 0.0074 | U | 0.007 | U |
| PCB-1254 | -- | -- | -- | -- | -- | -- | 230 | 294 | -- | 0.0016 | U | 0.0017 | U | 0.0019 | U | 0.0018 | U | 0.0017 | U | 0.0019 | U | 0.0018 | U |
| PCB-1260 | -- | -- | -- | -- | -- | -- | 138 | 140 | -- | 0.0016 | U | 0.0017 | U | 0.0019 | UJ | 0.0018 | U | 0.0017 | U | 0.0019 | U | 0.0018 | U |
| Total PCBs | 12 | 0.13 | 3.1 | 10.0 | 2.0 | 0.0341 | 62 | 354 | 676 | | | | | | | | | | | | | | |

Notes:

-- Indicates no numerical criterion of this type for this chemical. nm = not measured

¹Sediment Management Standard (WAC 173-204)

²NOAA SQUIRT - NOAA Screening Quick Reference Tables, developed by the Coastal Protection & Restoration Division of NOAA

³MacDonald - Values obtained from *Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines*, EPA 905/R-00/00

⁴Total organic carbon (TOC) analyzed via two different methods: STL used the PSEP Modified Lloyd-Kahn method; ARI used the Plumb, 1981 method

SL = screening level. ML = maximum level

TEL = threshold effects level. LAET = Lowest Apparent Effects Threshold. 2LAET = Second Lowest Apparent Effects Threshold. PEC = probable effect

U = compound analyzed but not detected above the reporting limit. H = sample analyzed outside holding time. J = estimated value. M = result is less

B = analyte detected in sample and method blank (organics). Result reported is less than the reporting limit but greater than detection limit (inorganic

* - duplicate sample analysis is not within control limits (inorganics)

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | | |
|--|--------------------------------------|---------------------------------------|--------|-------------------------|--------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|--------|----|--------|----|--------|------|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-2631 | POV-2732 | POV-3338 | POV-3439 | POV-3540 | POV-3641 | POV-3742 | | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/17/06 | 10/16/06 | 10/19/06 | 10/18/06 | 10/17/06 | 10/17/06 | 10/16/06 | | | | | | |
| Conventional Parameters | | | | | | | | | | | | | | | | | | | | | | | |
| Ammonia (mg/kg) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 17 | | 18 | | 17 | | 18 | | 17 | | 17 | | | |
| Total Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 83 | | 78 | | 82 | | 78 | | 84 | | 83 | | | |
| Total Volatile Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.59 | | 0.43 | | 0.69 | | 0.6 | J | 0.56 | | 0.53 | | | |
| Total Organic Carbon (%) ⁴ | -- | -- | -- | -- | -- | -- | 9.82 | -- | -- | 0.050 | J | nm | | 0.208 | J | 0.179 | J | 0.084 | J | 0.126 | J | 0.0502 | U |
| Total Sulfides (mg/kg) | -- | -- | -- | -- | -- | -- | 702 | 941 | -- | 6.2 | UJ | 6.3 | UJ | 6.6 | UJ | 6.4 | UJ | 6.1 | UJ | 6.1 | UJ | 6.9 | UJ |
| Metals (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Antimony | -- | 150 | 200 | -- | -- | -- | 0.6 | 1.9 | -- | 0.1 | M | 0.052 | JB M | 0.19 | JB M | 0.12 | M | 0.06 | M | 0.16 | M | 0.045 | JB M |
| Arsenic | 57 | 57 | 700 | 20 | 20 | 5.9 | 31.4 | 50.9 | 33 | 1 | | 1.5 | | 1.4 | | 1.8 | | 1.2 | | 1.1 | | 1.3 | |
| Cadmium | 5.1 | 5.1 | 14 | 2 | 25 | 0.596 | 2.39 | 2.9 | 4.98 | 0.0043 | U | 0.0045 | U | 0.0034 | U | 0.0046 | U | 0.0044 | U | 0.0043 | U | 0.0042 | U |
| Chromium | 260 | -- | -- | 19 | 42 | 37.3 | 95 | 133 | 111 | 7.3 | | 9.8 | | 8.2 | | 7.6 | | 7.2 | | 7.9 | | 9.9 | |
| Copper | 390 | 390 | 1,300 | -- | 100 | 35.7 | 619 | 829 | 149 | 6.2 | | 8.7 | | 6.9 | | 6.3 | | 6.8 | | 6.2 | | 7.4 | |
| Lead | 450 | 450 | 1,200 | 1,000 | 220 | 35.0 | 335 | 431 | 128 | 1.9 | | 2 | | 2.6 | | 2 | | 2.1 | | 2.1 | | 2.1 | |
| Mercury | 0.41 | 0.41 | 2.3 | 2 | 9 | 0.174 | 0.8 | 3.04 | 1.06 | 0.0074 | U | 0.0085 | M | 0.0074 | U | 0.01 | U | 0.009 | U | 0.068 | | 0.0086 | U |
| Nickel | -- | 140 | 370 | -- | 1000 | 18.0 | 53.1 | 113 | 48.6 | 8.6 | | 11 | | 10 | | 8 | | 8.3 | | 8 | | 10 | |
| Silver | 6.1 | 6.1 | 8.4 | -- | -- | -- | 0.545 | 3.5 | -- | 0.027 | M | 0.042 | M | 0.04 | M | 0.036 | M | 0.038 | M | 0.022 | M | 0.038 | M |
| Zinc | 410 | 410 | 3,800 | -- | 270 | 123.1 | 683 | 1080 | 459 | 25 | | 28 | | 32 | | 26 | | 27 | | 29 | | 31 | |
| Organotins (ug/kg, bulk) | | | | | | | | | | | | | | | | | | | | | | | |
| Dibutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.14 | UJ | 0.15 | UJ | 0.14 | UJ | 0.15 | UJ | 0.14 | UJ | 0.14 | UJ | 0.14 | UJ |
| Monobutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.083 | UJ | 0.089 | UJ | 0.086 | UJ | 0.092 | UJ | 0.086 | UJ | 0.083 | UJ | 0.082 | UJ |
| Tetra-n-butyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.42 | UJ | 0.45 | UJ | 0.44 | UJ | 0.47 | UJ | 0.44 | UJ | 0.42 | UJ | 0.42 | UJ |
| Tributyltin (bulk) | -- | 75 (SEF) | -- | -- | -- | -- | -- | -- | -- | 0.45 | UJ | 0.48 | UJ | 0.46 | UJ | 0.49 | UJ | 0.46 | UJ | 0.44 | UJ | 0.44 | UJ |
| Polynuclear Aromatic Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | 38 | 670 | 1,900 | -- | -- | -- | 469 | 555 | -- | 3 | U | 3.8 | U | 3.6 | U | 3.7 | U | 3.7 | U | 2.6 | U | 3.5 | U |
| Acenaphthene | 16 | 500 | 2,000 | -- | -- | -- | 1060 | 1320 | -- | 5.6 | U | 6.9 | U | 6.6 | U | 6.9 | U | 6.8 | U | 4.8 | U | 6.5 | U |
| Acenaphthylene | 66 | 560 | 1,300 | -- | -- | -- | 470 | 640 | -- | 2.3 | U | 2.8 | U | 2.7 | U | 2.8 | U | 2.7 | U | 2 | U | 2.6 | U |
| Anthracene | 220 | 960 | 13,000 | -- | -- | -- | 1230 | 1580 | 845 | 4.2 | U | 5.2 | U | 5 | U | 5.2 | U | 5.1 | U | 3.6 | U | 4.9 | U |
| Fluorene | 23 | 540 | 3,600 | -- | -- | -- | 1070 | 3850 | 536 | 2.6 | U | 3.2 | U | 3 | U | 3.1 | U | 3.1 | U | 2.2 | U | 3 | U |
| Naphthalene | 99 | 2,100 | 2,400 | 5,000 | -- | -- | 529 | 1310 | 561 | 5.6 | U | 6.9 | U | 6.6 | U | 6.9 | U | 6.8 | U | 4.8 | U | 6.5 | U |
| Phenanthrene | 100 | 1,500 | 21,000 | -- | 30,000 | 41.9 | 6,100 | 7,570 | 1170 | 3.9 | U | 4.9 | U | 4.6 | U | 4.8 | U | 4.8 | U | 3.4 | U | 4.6 | U |
| Total LPAH | 370 | 5,200 | 29,000 | -- | -- | -- | 6590 | 9200 | -- | | | | | | | | | | | | | | |
| Benzo[a]anthracene | 110 | 1,300 | 5,100 | -- | -- | 31.7 | 4260 | 5800 | 1050 | 6.4 | U | 7.9 | U | 7.5 | U | 7.9 | U | 7.7 | U | 5.5 | U | 7.4 | U |
| Benzo[a]pyrene | 99 | 1,600 | 3,600 | 2,000 | -- | 31.9 | 3300 | 4810 | 1450 | 8.3 | U | 10 | U | 9.9 | U | 10 | U | 10 | U | 7.2 | U | 9.7 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 3,200 | -- | -- | -- | 4020 | 5200 | -- | 7.2 | U | 8.9 | U | 8.5 | U | 8.8 | U | 8.7 | U | 6.2 | U | 8.3 | U |
| Benzo[fluoranthene (b + k) | 230 | 3,200 | 9,900 | -- | -- | -- | 11000 | 13800 | -- | 9.8 | U | 12 | U | 12 | U | 12 | U | 12 | U | 8.5 | U | 11 | U |
| Chrysene | 110 | 1,400 | 21,000 | -- | -- | 57.1 | 5940 | 6400 | 1290 | 7.4 | U | 9.1 | U | 8.7 | U | 9.1 | U | 8.9 | U | 6.4 | U | 8.6 | U |
| Dibenzo(a,h)anthracene | 12 | 230 | 1,900 | -- | -- | -- | 800 | 839 | -- | 12 | U | 15 | U | 14 | U | 14 | U | 14 | U | 10 | U | 14 | U |
| Fluoranthene | 160 | 1,700 | 30,000 | -- | -- | 111 | 11100 | 15000 | 2230 | 3 | U | 3.8 | U | 3.6 | U | 3.7 | U | 3.7 | U | 2.6 | U | 3.5 | U |
| Indeno[1,2,3-cd]pyrene | 34 | 600 | 16,000 | -- | -- | -- | 4120 | 5300 | -- | 12 | U | 15 | U | 14 | U | 14 | U | 14 | U | 10 | U | 14 | U |
| Pyrene | 1,000 | 2,600 | 16,000 | -- | -- | 53 | 8790 | 16000 | 1520 | 2.7 | U | 3.3 | U | 3.1 | U | 3.3 | U | 3.2 | U | 2.3 | U | 3.1 | U |
| Total HPAH | 960 | 12,000 | 69,000 | -- | -- | -- | 31640 | 54800 | -- | | | | | | | | | | | | | | |
| Chlorinated Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 64 | -- | -- | -- | -- | -- | -- | 9.7 | U | 12 | U | 11 | U | 12 | U | 12 | U | 8.4 | U | 11 | U |
| 1,2-Dichlorobenzene | 2.3 | 35 | 110 | -- | -- | -- | -- | -- | -- | 17 | U | 21 | U | 20 | U | 21 | U | 20 | U | 14 | U | 19 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 120 | -- | -- | -- | -- | -- | -- | 7.5 | U | 9.2 | U | 8.8 | U | 9.2 | U | 9.1 | U | 6.4 | U | 8.7 | U |
| Hexachlorobenzene | 0.38 | 22 | 230 | -- | -- | -- | -- | -- | -- | 0.18 | U | 0.22 | U | 0.22 | U | 0.16 | UJ | 0.17 | U | 0.18 | U | 0.2 | U |

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | | | | | |
|---|--------------------------------------|---------------------------------------|-------|-------------------------|---------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|--------|---|--------|------|--------|----|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-2631 | POV-2732 | POV-3338 | POV-3439 | POV-3540 | POV-3641 | POV-3742 | | | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/17/06 | 10/16/06 | 10/19/06 | 10/18/06 | 10/17/06 | 10/17/06 | 10/16/06 | | | | | | |
| Phthalates (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Bis(2-ethylhexyl) phthalate | 47 | 8,300 | -- | -- | -- | -- | 2520 | 6380 | -- | 240 | U | 290 | U | 280 | U | 290 | U | 290 | U | 200 | U | 270 | U |
| Butyl benzyl phthalate | 4.9 | 970 | -- | -- | -- | -- | 260 | 366 | -- | 28 | U | 35 | U | 34 | U | 35 | U | 35 | U | 25 | U | 33 | U |
| Diethyl phthalate | 61 | 1,200 | -- | -- | -- | -- | -- | -- | -- | 7.1 | U | 8.7 | UJ | 8.4 | U | 8.7 | U | 8.6 | U | 6.1 | U | 8.2 | UJ |
| Dimethyl phthalate | 53 | 1,400 | -- | -- | -- | -- | 311 | 436 | -- | 7.6 | U | 9.3 | U | 8.9 | U | 9.3 | U | 9.2 | U | 6.5 | U | 8.8 | U |
| Di-n-butyl phthalate | 220 | 5,100 | -- | -- | 200,000 | -- | 103 | -- | -- | 60 | JB M | 16 | U | 67 | JB M | 16 | U | 15 | U | 48 | JB M | 15 | U |
| Di-n-octyl phthalate | 58 | 6,200 | -- | -- | -- | -- | 11 | 201 | -- | 32 | U | 40 | U | 38 | U | 40 | U | 39 | U | 140 | M | 38 | U |
| Phenols (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 2,4-Dimethylphenol | 29 | 29 | 210 | -- | -- | -- | -- | -- | -- | 19 | U | 23 | U | 22 | U | 23 | U | 23 | U | 16 | U | 22 | U |
| 2-Methylphenol | 63 | 63 | 77 | -- | -- | -- | -- | -- | -- | 27 | U | 34 | U | 33 | U | 34 | U | 33 | U | 24 | U | 32 | U |
| 3 & 4 Methylphenol | 670 | 670 | 3,600 | -- | -- | -- | 760 | 2360 | -- | 52 | U | 64 | U | 62 | U | 64 | U | 63 | U | 45 | U | 61 | U |
| Pentachlorophenol | 360 | 400 | 690 | -- | 11,000 | -- | -- | -- | -- | 30 | U | 38 | U | 36 | U | 37 | U | 37 | U | 26 | U | 35 | U |
| Phenol | 420 | 420 | 1,200 | -- | -- | -- | -- | -- | -- | 27 | U | 33 | U | 31 | U | 33 | U | 32 | U | 23 | U | 31 | U |
| Miscellaneous Extractables (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| Benzoic acid | 650 | 650 | 760 | -- | -- | -- | 2910 | 3790 | -- | 820 | U | 1000 | U | 960 | UJ | 1000 | U | 990 | U | 700 | U | 950 | U |
| Benzyl alcohol | 57 | 57 | 870 | -- | -- | -- | -- | -- | -- | 29 | U | 36 | U | 35 | U | 36 | U | 36 | U | 25 | U | 34 | U |
| Dibenzofuran | 15 | 540 | 1,700 | -- | -- | -- | 399 | 443 | -- | 17 | U | 21 | U | 20 | U | 21 | U | 20 | U | 14 | U | 19 | U |
| Hexachlorobutadiene | 3.9 | 29 | 270 | -- | -- | -- | -- | -- | -- | 0.11 | U | 0.13 | U | 0.13 | U | 0.093 | UJ | 0.1 | U | 0.11 | U | 0.12 | U |
| N-Nitrosodiphenylamine | 11 | 28 | 130 | -- | -- | -- | -- | -- | -- | 15 | UJ | 18 | UJ | 17 | U | 18 | U | 18 | U | 13 | UJ | 17 | UJ |
| Pesticides (ug/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| 4,4'-DDD | -- | -- | -- | -- | -- | 3.54 | 96 | -- | 28.0 | 0.27 | U | 0.33 | U | 0.32 | U | 0.23 | UJ | 0.25 | U | 0.26 | U | 0.3 | U |
| 4,4'-DDE | -- | -- | -- | -- | -- | 1.42 | 21 | -- | 31.3 | 0.23 | U | 0.28 | U | 0.27 | U | 0.2 | UJ | 0.22 | U | 0.22 | U | 0.25 | U |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | 19 | -- | 62.9 | 0.27 | U | 0.33 | U | 0.32 | U | 0.35 | J M | 0.34 | M | 0.26 | U | 0.29 | U |
| Total DDT | -- | 6.9 | 69 | 4,000 | 1,000 | 6.98 | -- | -- | 572 | | | | | | | | | | | | | | |
| Aldrin | -- | 10 | -- | -- | 170 | -- | -- | -- | -- | 0.11 | U | 0.13 | U | 0.13 | U | 0.093 | UJ | 0.1 | U | 0.11 | U | 0.12 | U |
| alpha-Chlordane | -- | 10 | -- | -- | 1,000 | 4.5 | -- | -- | 17.6 | 0.12 | U | 0.15 | U | 0.14 | U | 0.1 | UJ | 0.11 | U | 0.12 | U | 0.13 | U |
| Dieldrin | -- | 10 | -- | -- | 170 | 2.85 | -- | -- | 61.8 | 0.22 | U | 0.27 | U | 0.27 | U | 0.19 | UJ | 0.21 | U | 0.22 | U | 0.25 | U |
| gamma-BHC (Lindane) | -- | 10 | -- | 10 | -- | 0.94 | -- | -- | 4.99 | 0.12 | U | 0.14 | U | 0.14 | U | 0.1 | UJ | 0.11 | U | 0.11 | U | 0.13 | U |
| Heptachlor | -- | 10 | -- | -- | -- | 0.6 | -- | -- | 16.0 | 0.14 | U | 0.17 | U | 0.16 | U | 0.12 | UJ | 0.13 | U | 0.13 | U | 0.15 | U |
| Polychlorinated biphenyls (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | |
| PCB-1016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0068 | U | 0.0068 | UJ | 0.0066 | U | 0.0074 | U | 0.0068 | U | 0.0064 | U | 0.0067 | UJ |
| PCB-1221 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0068 | U | 0.0068 | U | 0.0066 | U | 0.0074 | U | 0.0068 | U | 0.0064 | U | 0.0067 | U |
| PCB-1232 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0068 | U | 0.0068 | U | 0.0066 | U | 0.0074 | U | 0.0068 | U | 0.0064 | U | 0.0067 | U |
| PCB-1242 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0068 | U | 0.0068 | U | 0.0066 | U | 0.0074 | U | 0.0068 | U | 0.0064 | U | 0.0067 | U |
| PCB-1248 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0068 | U | 0.0068 | U | 0.0066 | U | 0.0074 | U | 0.0068 | U | 0.0064 | U | 0.0067 | U |
| PCB-1254 | -- | -- | -- | -- | -- | -- | 230 | 294 | -- | 0.0018 | U | 0.0018 | U | 0.0017 | U | 0.0019 | U | 0.0018 | U | 0.0017 | U | 0.0017 | U |
| PCB-1260 | -- | -- | -- | -- | -- | -- | 138 | 140 | -- | 0.0018 | U | 0.0018 | UJ | 0.0017 | U | 0.0019 | U | 0.0018 | U | 0.0017 | U | 0.0017 | UJ |
| Total PCBs | 12 | 0.13 | 3.1 | 10.0 | 2.0 | 0.0341 | 62 | 354 | 676 | | | | | | | | | | | | | | |

Notes:

-- Indicates no numerical criterion of this type for this chemical. nm = not measured

¹Sediment Management Standard (WAC 173-204)

²NOAA SQUIRT - NOAA Screening Quick Reference Tables, developed by the Coastal Protection & Restoration Division of NOAA

³MacDonald - Values obtained from *Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines*, EPA 905/R-00/00

⁴Total organic carbon (TOC) analyzed via two different methods: STL used the PSEP Modified Lloyd-Kahn method; ARI used the Plumb, 1981 method
SL = screening level. ML = maximum level

TEL = threshold effects level. LAET = Lowest Apparent Effects Threshold. 2LAET = Second Lowest Apparent Effects Threshold. PEC = probable effect
U = compound analyzed but not detected above the reporting limit. H = sample analyzed outside holding time. J = estimated value. M = result is less than the reporting limit but greater than detection limit (inorganic)

* - duplicate sample analysis is not within control limits (inorganics)

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | |
|--|--------------------------------------|---------------------------------------|--------|-------------------------|--------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|--------|------|--------|------|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-4344 | POV-4546 | POV-4748 | POV-4952 | POV-5051 | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/19/06 | 10/19/06 | 10/17/06 | 10/19/06 | 10/19/06 | | | | |
| Conventional Parameters | | | | | | | | | | | | | | | | | | | |
| Ammonia (mg/kg) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 17 | | 17 | | 17 | | 18 | | 17 | |
| Total Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 84 | | 84 | | 83 | J | 80 | | 85 | |
| Total Volatile Solids (%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.65 | | 0.61 | | 0.66 | | 0.62 | | 0.63 | |
| Total Organic Carbon (%) ⁴ | -- | -- | -- | -- | -- | -- | 9.82 | -- | -- | nm | | 0.111 | J | 0.0504 | U | 0.061 | J | 0.091 | J |
| Total Sulfides (mg/kg) | -- | -- | -- | -- | -- | -- | 702 | 941 | -- | 5.9 | UJ | 6.6 | UJ | 6.8 | UJ | 6.5 | UJ | 6.5 | UJ |
| Metals (mg/kg) | | | | | | | | | | | | | | | | | | | |
| Antimony | -- | 150 | 200 | -- | -- | -- | 0.6 | 1.9 | -- | 0.12 | JB M | 0.095 | JB M | 0.041 | JB M | 0.076 | JB M | 0.094 | JB M |
| Arsenic | 57 | 57 | 700 | 20 | 20 | 5.9 | 31.4 | 50.9 | 33 | 0.93 | | 1 | | 1.2 | | 1.2 | | 1.2 | |
| Cadmium | 5.1 | 5.1 | 14 | 2 | 25 | 0.596 | 2.39 | 2.9 | 4.98 | 0.0041 | U | 0.0045 | U | 0.0043 | U | 0.0042 | U | 0.0038 | U |
| Chromium | 260 | -- | -- | 19 | 42 | 37.3 | 95 | 133 | 111 | 7.2 | | 8.4 | | 8.1 | | 8 | | 7.5 | |
| Copper | 390 | 390 | 1,300 | -- | 100 | 35.7 | 619 | 829 | 149 | 6.2 | | 6.8 | | 6.3 | | 6.7 | | 6.7 | |
| Lead | 450 | 450 | 1,200 | 1,000 | 220 | 35.0 | 335 | 431 | 128 | 2.3 | | 2.2 | | 2 | | 2 | | 2.7 | |
| Mercury | 0.41 | 0.41 | 2.3 | 2 | 9 | 0.174 | 0.8 | 3.04 | 1.06 | 0.0086 | U | 0.0075 | U | 0.0071 | U | 0.0071 | U | 0.0088 | U |
| Nickel | -- | 140 | 370 | -- | 1000 | 18.0 | 53.1 | 113 | 48.6 | 7.2 | | 9.1 | | 9.2 | | 9.8 | | 7.5 | |
| Silver | 6.1 | 6.1 | 8.4 | -- | -- | -- | 0.545 | 3.5 | -- | 0.035 | M | 0.037 | M | 0.025 | M | 0.045 | M | 0.039 | M |
| Zinc | 410 | 410 | 3,800 | -- | 270 | 123.1 | 683 | 1080 | 459 | 28 | | 29 | | 25 | | 25 | | 35 | |
| Organotins (ug/kg, bulk) | | | | | | | | | | | | | | | | | | | |
| Dibutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.14 | UJ | 0.14 | UJ | 0.14 | UJ | 0.14 | UJ | 0.13 | UJ |
| Monobutyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.084 | UJ | 0.084 | UJ | 0.085 | UJ | 0.088 | UJ | 0.081 | UJ |
| Tetra-n-butyltin | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.43 | UJ | 0.43 | UJ | 0.43 | UJ | 0.44 | UJ | 0.41 | UJ |
| Tributyltin (bulk) | -- | 75 (SEF) | -- | -- | -- | -- | -- | -- | -- | 0.45 | UJ | 0.45 | UJ | 0.46 | UJ | 0.47 | UJ | 0.43 | UJ |
| Polynuclear Aromatic Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | |
| 2-Methylnaphthalene | 38 | 670 | 1,900 | -- | -- | -- | 469 | 555 | -- | 3.5 | U | 3.6 | U | 2.5 | U | 3.7 | U | 3.6 | U |
| Acenaphthene | 16 | 500 | 2,000 | -- | -- | -- | 1060 | 1320 | -- | 6.5 | U | 6.6 | U | 4.6 | U | 6.8 | U | 6.6 | U |
| Acenaphthylene | 66 | 560 | 1,300 | -- | -- | -- | 470 | 640 | -- | 2.6 | U | 2.7 | U | 1.9 | U | 2.8 | U | 2.6 | U |
| Anthracene | 220 | 960 | 13,000 | -- | -- | -- | 1230 | 1580 | 845 | 4.9 | U | 5 | U | 3.5 | U | 5.2 | U | 5 | U |
| Fluorene | 23 | 540 | 3,600 | -- | -- | -- | 1070 | 3850 | 536 | 2.9 | U | 3 | U | 2.1 | U | 3.1 | U | 3 | U |
| Naphthalene | 99 | 2,100 | 2,400 | 5,000 | -- | -- | 529 | 1310 | 561 | 6.5 | U | 6.6 | U | 4.6 | U | 6.8 | U | 6.6 | U |
| Phenanthrene | 100 | 1,500 | 21,000 | -- | 30,000 | 41.9 | 6,100 | 7,570 | 1170 | 4.5 | U | 4.6 | U | 3.3 | U | 4.8 | U | 4.6 | U |
| Total LPAH | 370 | 5,200 | 29,000 | -- | -- | -- | 6590 | 9200 | -- | | | | | | | | | | |
| Benzo[a]anthracene | 110 | 1,300 | 5,100 | -- | -- | 31.7 | 4260 | 5800 | 1050 | 7.4 | U | 7.5 | U | 5.3 | U | 7.8 | U | 7.5 | U |
| Benzo[a]pyrene | 99 | 1,600 | 3,600 | 2,000 | -- | 31.9 | 3300 | 4810 | 1450 | 9.6 | U | 9.8 | U | 6.9 | U | 10 | U | 9.8 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 3,200 | -- | -- | -- | 4020 | 5200 | -- | 8.3 | U | 8.4 | U | 6 | U | 8.8 | U | 8.4 | U |
| Benzo[fluoranthene (b + k) | 230 | 3,200 | 9,900 | -- | -- | -- | 11000 | 13800 | -- | 11 | U | 12 | U | 8.2 | U | 12 | U | 12 | U |
| Chrysene | 110 | 1,400 | 21,000 | -- | -- | 57.1 | 5940 | 6400 | 1290 | 8.5 | U | 8.7 | U | 6.1 | U | 9 | U | 8.6 | U |
| Dibenzo(a,h)anthracene | 12 | 230 | 1,900 | -- | -- | -- | 800 | 839 | -- | 14 | U | 14 | U | 9.8 | U | 14 | U | 14 | U |
| Fluoranthene | 160 | 1,700 | 30,000 | -- | -- | 111 | 11100 | 15000 | 2230 | 3.5 | U | 3.6 | U | 2.5 | U | 3.7 | U | 3.6 | U |
| Indeno[1,2,3-cd]pyrene | 34 | 600 | 16,000 | -- | -- | -- | 4120 | 5300 | -- | 14 | U | 14 | U | 9.8 | U | 14 | U | 14 | U |
| Pyrene | 1,000 | 2,600 | 16,000 | -- | -- | 53 | 8790 | 16000 | 1520 | 3.1 | U | 3.1 | U | 2.2 | U | 3.2 | U | 3.1 | U |
| Total HPAH | 960 | 12,000 | 69,000 | -- | -- | -- | 31640 | 54800 | -- | | | | | | | | | | |
| Chlorinated Hydrocarbons (ug/kg) | | | | | | | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 64 | -- | -- | -- | -- | -- | -- | 11 | U | 11 | U | 8.1 | U | 12 | U | 11 | U |
| 1,2-Dichlorobenzene | 2.3 | 35 | 110 | -- | -- | -- | -- | -- | -- | 19 | U | 20 | U | 14 | U | 20 | U | 20 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 120 | -- | -- | -- | -- | -- | -- | 8.6 | U | 8.8 | U | 6.2 | U | 9.1 | U | 8.8 | U |
| Hexachlorobenzene | 0.38 | 22 | 230 | -- | -- | -- | -- | -- | -- | 0.2 | U | 0.2 | U | 0.18 | U | 0.23 | U | 0.2 | U |

**Table 4
Port of Vancouver
Analytical Data**

| Analyte | Screening Levels | | | | | | | | | Analytical results | | | | | | | | | |
|---|--------------------------------------|---------------------------------------|-------|-------------------------|---------|--------------------------|---------------------------|-----------|------------------------|---------------------|----------|----------|----------|----------|----------|--------|------|--------|------|
| | Sediment Mgt. Standards ¹ | Dredged Material Evaluation Framework | | Model Toxic Control Act | | NOAA SQUIRT ² | WA Ecology Freshwater SQS | | MacDonald ³ | POV-4344 | POV-4546 | POV-4748 | POV-4952 | POV-5051 | | | | | |
| | | SQS | SL | ML | MTCA1 | MTCA2 | Freshwater TEL | 2003 LAET | 2003 2LAET | Consensus-based PEC | 10/19/06 | 10/19/06 | 10/17/06 | 10/19/06 | 10/19/06 | | | | |
| Phthalates (ug/kg) | | | | | | | | | | | | | | | | | | | |
| Bis(2-ethylhexyl) phthalate | 47 | 8,300 | -- | -- | -- | -- | 2520 | 6380 | -- | 270 | U | 280 | U | 200 | U | 290 | U | 280 | U |
| Butyl benzyl phthalate | 4.9 | 970 | -- | -- | -- | -- | 260 | 366 | -- | 33 | U | 33 | U | 24 | U | 35 | U | 33 | U |
| Diethyl phthalate | 61 | 1,200 | -- | -- | -- | -- | -- | -- | -- | 8.2 | U | 8.3 | U | 5.9 | U | 8.6 | U | 8.3 | U |
| Dimethyl phthalate | 53 | 1,400 | -- | -- | -- | -- | 311 | 436 | -- | 8.7 | U | 8.9 | U | 6.3 | U | 9.2 | U | 8.9 | U |
| Di-n-butyl phthalate | 220 | 5,100 | -- | -- | 200,000 | -- | 103 | -- | -- | 63 | JB M | 66 | JB M | 48 | JB M | 71 | JB M | 65 | JB M |
| Di-n-octyl phthalate | 58 | 6,200 | -- | -- | -- | -- | 11 | 201 | -- | 37 | U | 38 | U | 140 | M | 200 | JB M | 38 | U |
| Phenols (ug/kg) | | | | | | | | | | | | | | | | | | | |
| 2,4-Dimethylphenol | 29 | 29 | 210 | -- | -- | -- | -- | -- | -- | 22 | U | 22 | U | 15 | U | 23 | U | 22 | U |
| 2-Methylphenol | 63 | 63 | 77 | -- | -- | -- | -- | -- | -- | 32 | U | 32 | U | 23 | U | 34 | U | 32 | U |
| 3 & 4 Methylphenol | 670 | 670 | 3,600 | -- | -- | -- | 760 | 2360 | -- | 60 | U | 61 | U | 43 | U | 64 | U | 61 | U |
| Pentachlorophenol | 360 | 400 | 690 | -- | 11,000 | -- | -- | -- | -- | 35 | U | 36 | U | 25 | U | 37 | U | 36 | U |
| Phenol | 420 | 420 | 1,200 | -- | -- | -- | -- | -- | -- | 31 | U | 31 | U | 22 | U | 32 | U | 31 | U |
| Miscellaneous Extractables (ug/kg) | | | | | | | | | | | | | | | | | | | |
| Benzoic acid | 650 | 650 | 760 | -- | -- | -- | 2910 | 3790 | -- | 940 | UJ | 960 | UJ | 680 | U | 1000 | UJ | 960 | UJ |
| Benzyl alcohol | 57 | 57 | 870 | -- | -- | -- | -- | -- | -- | 34 | U | 35 | U | 24 | U | 36 | U | 35 | U |
| Dibenzofuran | 15 | 540 | 1,700 | -- | -- | -- | 399 | 443 | -- | 19 | U | 20 | U | 14 | U | 20 | U | 20 | U |
| Hexachlorobutadiene | 3.9 | 29 | 270 | -- | -- | -- | -- | -- | -- | 0.12 | U | 0.12 | U | 0.11 | U | 0.13 | U | 0.12 | U |
| N-Nitrosodiphenylamine | 11 | 28 | 130 | -- | -- | -- | -- | -- | -- | 17 | U | 17 | U | 12 | UJ | 18 | U | 17 | U |
| Pesticides (ug/kg) | | | | | | | | | | | | | | | | | | | |
| 4,4'-DDD | -- | -- | -- | -- | -- | 3.54 | 96 | -- | 28.0 | 0.3 | U | 0.29 | U | 0.26 | U | 0.33 | U | 0.3 | U |
| 4,4'-DDE | -- | -- | -- | -- | -- | 1.42 | 21 | -- | 31.3 | 0.26 | U | 0.25 | U | 0.22 | U | 0.29 | U | 0.26 | U |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | 19 | -- | 62.9 | 0.3 | U | 0.29 | U | 0.26 | U | 0.33 | U | 0.3 | U |
| Total DDT | -- | 6.9 | 69 | 4,000 | 1,000 | 6.98 | -- | -- | 572 | | | | | | | | | | |
| Aldrin | -- | 10 | -- | -- | 170 | -- | -- | -- | -- | 0.12 | U | 0.12 | U | 0.11 | U | 0.13 | U | 0.12 | U |
| alpha-Chlordane | -- | 10 | -- | -- | 1,000 | 4.5 | -- | -- | 17.6 | 0.13 | U | 0.13 | U | 0.12 | U | 0.15 | U | 0.13 | U |
| Dieldrin | -- | 10 | -- | -- | 170 | 2.85 | -- | -- | 61.8 | 0.25 | U | 0.24 | U | 0.22 | U | 0.28 | U | 0.25 | U |
| gamma-BHC (Lindane) | -- | 10 | -- | 10 | -- | 0.94 | -- | -- | 4.99 | 0.13 | U | 0.13 | U | 0.11 | U | 0.15 | U | 0.13 | U |
| Heptachlor | -- | 10 | -- | -- | -- | 0.6 | -- | -- | 16.0 | 0.15 | U | 0.15 | U | 0.13 | U | 0.17 | U | 0.15 | U |
| Polychlorinated biphenyls (mg/kg) | | | | | | | | | | | | | | | | | | | |
| PCB-1016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0068 | U | 0.007 | U | 0.0064 | U |
| PCB-1221 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0068 | U | 0.007 | U | 0.0064 | U |
| PCB-1232 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0068 | U | 0.007 | U | 0.0064 | U |
| PCB-1242 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0068 | U | 0.007 | U | 0.0064 | U |
| PCB-1248 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | U | 0.0065 | U | 0.0068 | U | 0.007 | U | 0.0064 | U |
| PCB-1254 | -- | -- | -- | -- | -- | -- | 230 | 294 | -- | 0.0017 | U | 0.0017 | U | 0.0018 | U | 0.0018 | U | 0.0016 | U |
| PCB-1260 | -- | -- | -- | -- | -- | -- | 138 | 140 | -- | 0.0017 | U | 0.0017 | U | 0.0018 | U | 0.0018 | U | 0.0016 | U |
| Total PCBs | 12 | 0.13 | 3.1 | 10.0 | 2.0 | 0.0341 | 62 | 354 | 676 | | | | | | | | | | |

Notes:

-- Indicates no numerical criterion of this type for this chemical. nm = not measured

¹Sediment Management Standard (WAC 173-204)

²NOAA SQUIRT - NOAA Screening Quick Reference Tables, developed by the Coastal Protection & Restoration Division of NOAA

³MacDonald - Values obtained from *Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines*, EPA 905/R-00/00

⁴Total organic carbon (TOC) analyzed via two different methods: STL used the PSEP Modified Lloyd-Kahn method; ARI used the Plumb, 1981 method
SL = screening level. ML = maximum level

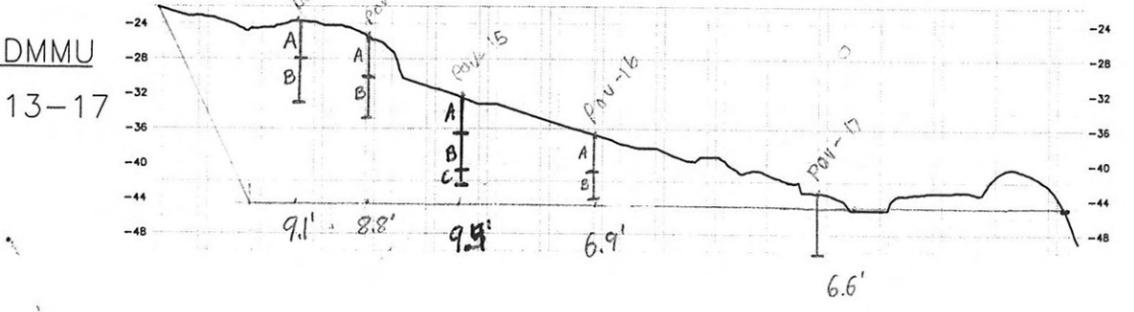
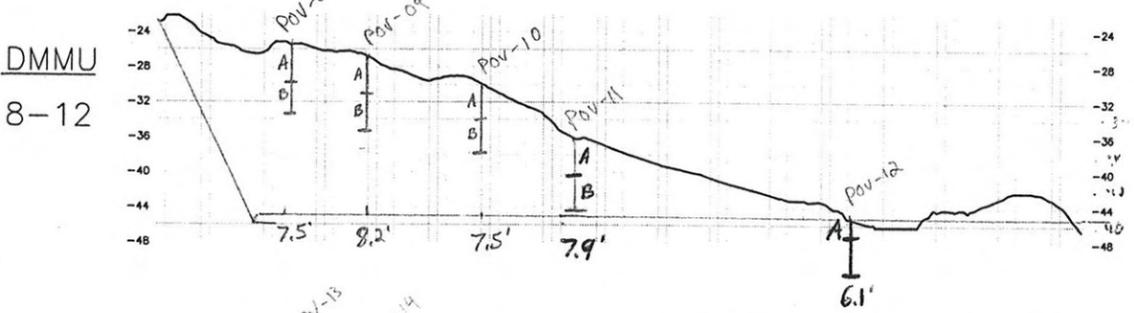
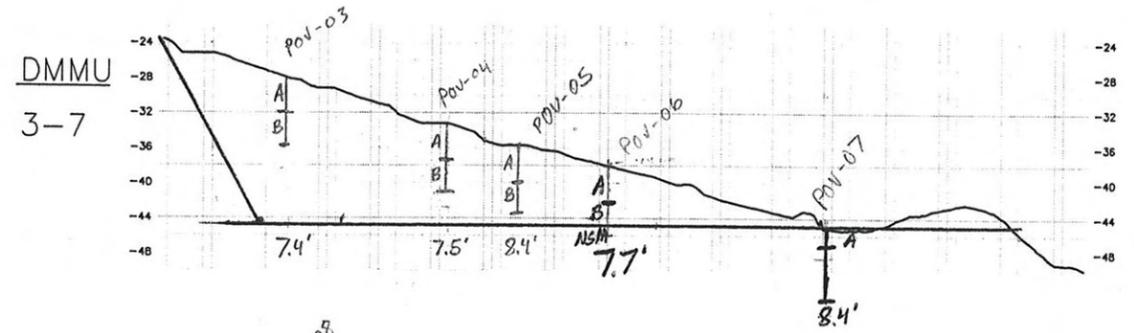
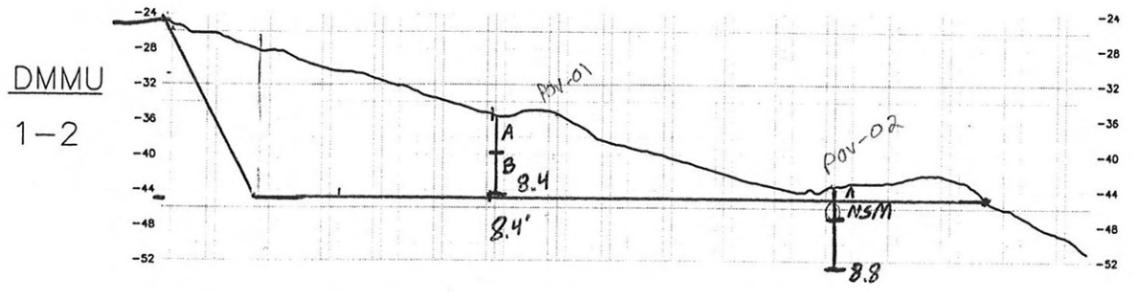
TEL = threshold effects level. LAET = Lowest Apparent Effects Threshold. 2LAET = Second Lowest Apparent Effects Threshold. PEC = probable effect
U = compound analyzed but not detected above the reporting limit. H = sample analyzed outside holding time. J = estimated value. M = result is less than the reporting limit but greater than detection limit (inorganic)

* - duplicate sample analysis is not within control limits (inorganics)

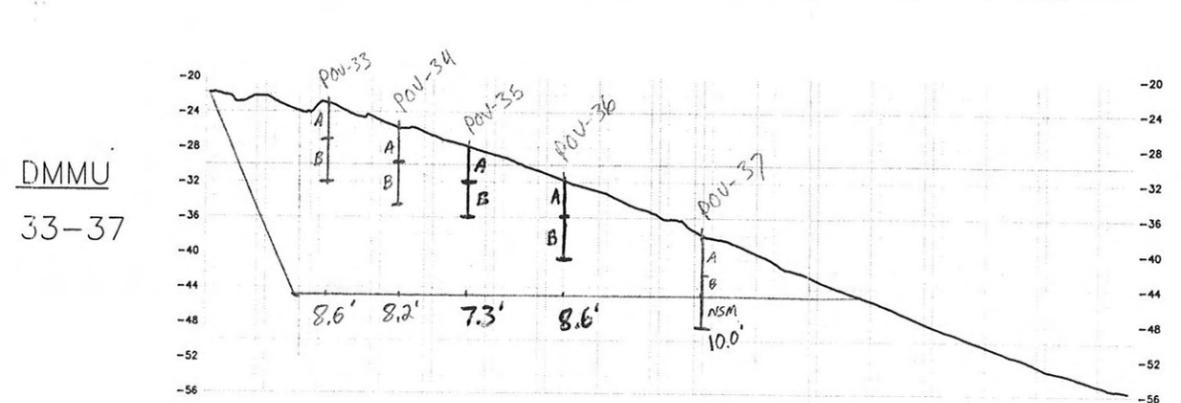
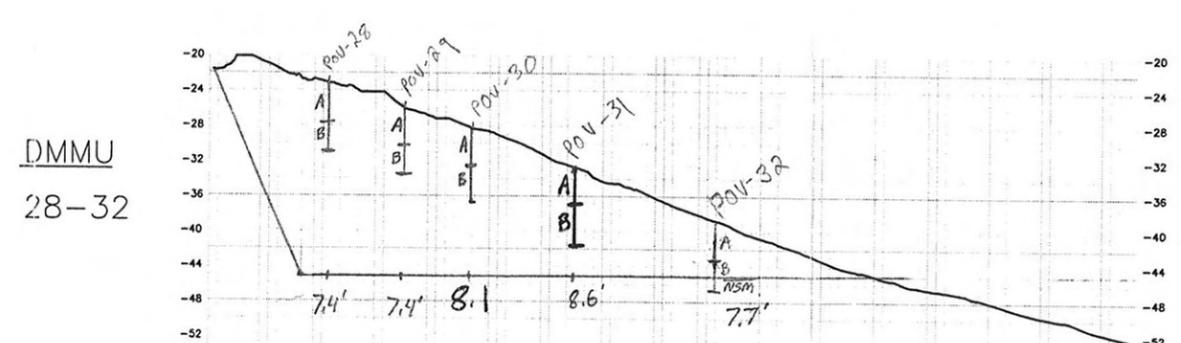
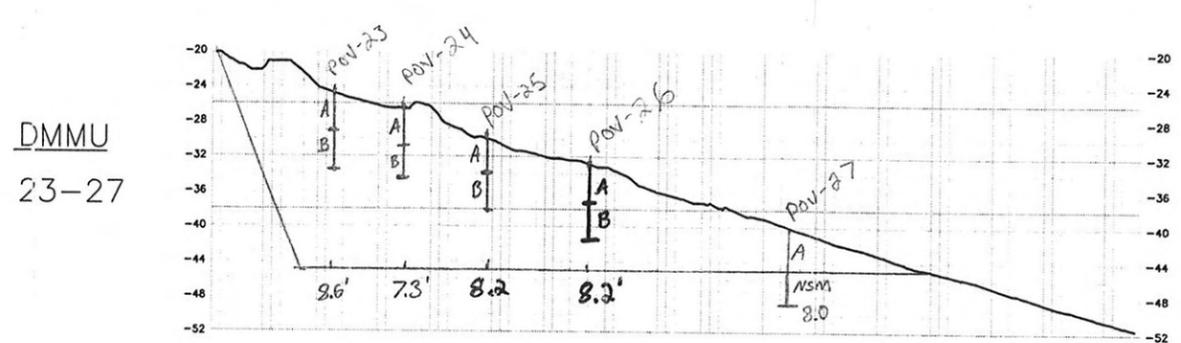
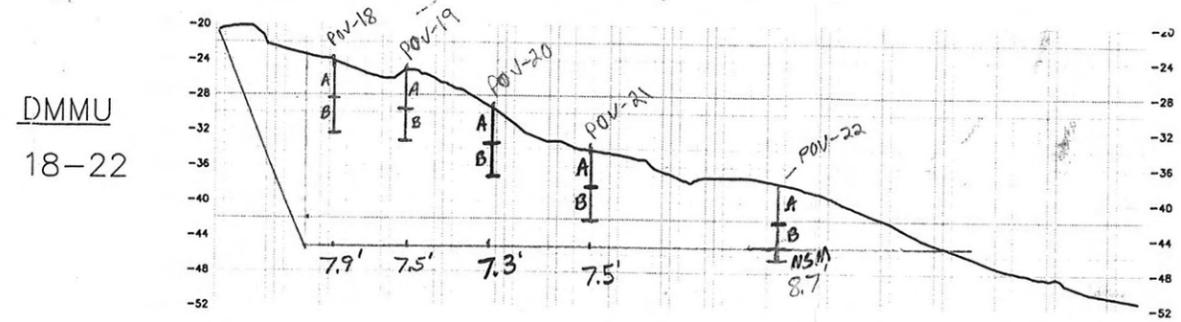
APPENDIX B

Field Documentation

Dredge Prism Cross-Sections



DMMU PROFILES - LOOKING UPSTREAM
SCALE: HORIZ: 1"=200' VERT: 1"=20'



PRELIMINARY
NOT FOR CONSTRUCTION

700 NE MULTNOMAH ST., SUITE 900
PORTLAND, OREGON
97232-4189
BERGER/ABAM
ENGINEERING, INC.
VOICE: (503) 731-6641
FAX: (503) 731-8902

DRAWING SCALE:
DRAWN BY:
APPROVED BY:
DATE:

| NO. | DATE |
|-----|------|
| | |
| | |
| | |

PORT OF VANCOUVER U.S.A.
3103 N.W. LOWER RIVER ROAD
VANCOUVER, WA 98660-1027
(360) 693-3611 FAX (360) 735-1565

SHEET CONTENTS:

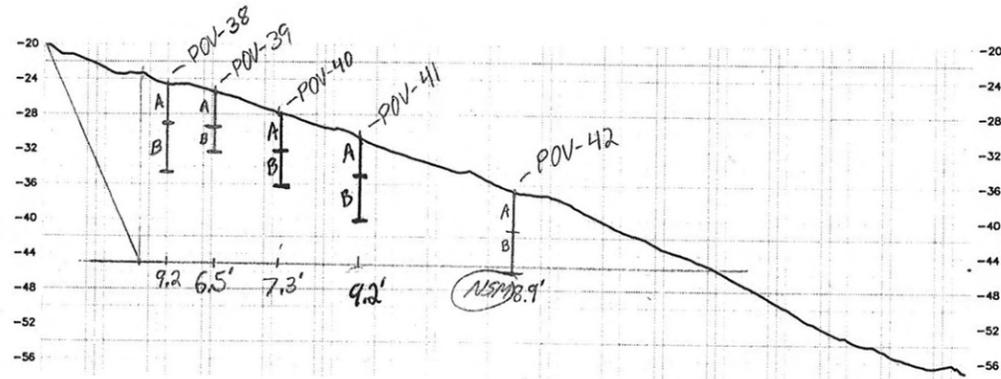
DRAWING NUMBER

SHEET NUMBER OF
POV PROJECT NO:

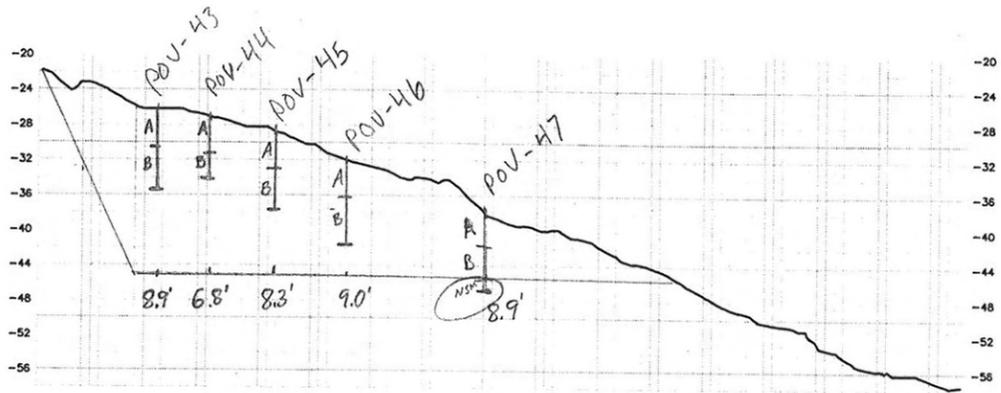
AE PROJECT NUMBER:

Dredge Prism Cross-Sections

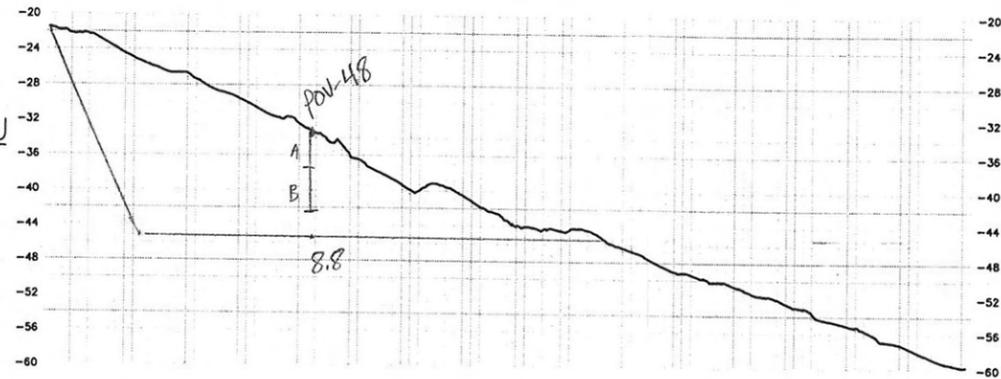
DMMU
38-42



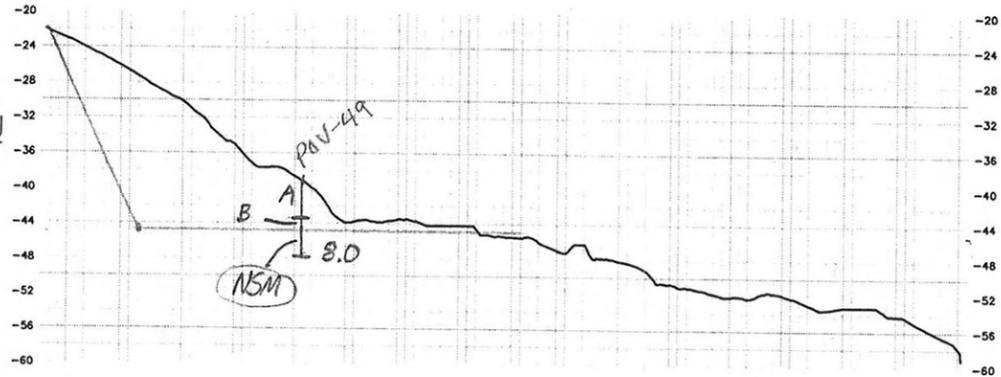
DMMU
43-47



DMMU
48



DMMU
49



DMMU's 50, 51, 52 not shown

DMMU PROFILES - LOOKING UPSTREAM
SCALE: HORIZ: 1"=200' VERT: 1"=20'

700 NE MULTNOMAH ST., SUITE 900
PORTLAND, OREGON
BERGER/ABAM
ENGINEERS, INC.
PHONE: (503) 731-6041
FAX: (503) 731-8902

A/E PROJECT NUMBER: _____

DRAWING SCALE: _____
DRAWN BY: _____
APPROVED BY: _____
DATE: _____

REVISIONS
NO. DATE _____

PORT OF VANCOUVER U.S.A.
3103 N.W. LOWER RIVER ROAD
VANCOUVER, WA 98660-1027
(360) 693-3611 FAX (360) 735-1565

SHEET CONTENTS:

DRAWING NUMBER

SHEET NUMBER OF _____
POV PROJECT NO: _____

**PRELIMINARY
NOT FOR CONSTRUCTION**

Port of Vancouver Gateway Expansion
Sediment Sample Log
October 2006

①

| Date | Sample Time | Sample | Sample Interval (ft) | Notes | |
|----------|-------------|------------------------|---------------------------|---------------------------------|--------------|
| 10-12-06 | 1110 | POV-0308 | 0-8'9" | COC 10-13-06 | |
| | 1357 | 03A | 0-4 | | |
| | 1406 | 03B | 4-8 | | |
| | 1426 | 08A | 0-4 | | |
| | 1435 | 08B | 4-9'6" | | |
| | 1255 | POV-0510 | 0-9'4"8'3" | | |
| | 1314 | 05A | 0-4 | | |
| | 1309 | 05B | 4-9'4" | | |
| | 1326 | 10A | 0-4 | | |
| | 1339 | 10B | 4-8'3" | | |
| | 1527 | POV-0409 | 0- | | |
| | 1609 | 04A | 0-4 | | |
| | 1616 | 04B | 4-8'8" | | |
| | 1505 | 09A | 0-4 | | |
| | 1539 | 09B | | | |
| 10-13-06 | 1517 | POV-0611 | 0-8'8" / 11'7" | 06-8'3", 11- 7" 7'9" | |
| | 1506 | POV-06A | 0-4 | COC 10-17-06 | |
| | 1511 | POV-06B | 4-7 | | |
| | 1500 | POV- 06 11A | 0-4 | | |
| | 1513 | POV-11B | 4-7.9 | | |
| | 1520 | POV-06NSM | 7-7.7 | | 06NSM NO TBT |
| | 1555 | POV-0102 | | | |
| | 1624 | POV-01A | | | |
| | 1629 | POV-01B | | | |
| | 1550 | POV-02NSM | | | |
| | 1545 | POV-02A | | | |
| | 1815 | POV-0712 | | | |
| | 1810 | POV-07NSM | | | |
| | 1806 | POV-12 | | | |

04-8'8"

01-8'10"

02-9'3"

Port of Vancouver Gateway Expansion
Sediment Sample Log
October 2006

2

| Date | Sample Time | Sample | Interval (ft) | Notes |
|----------|-----------------|-----------|---------------|--------------|
| 10-16-06 | 0935 | POV-32NSM | | COC 10-17-06 |
| | 0955 | POV-32A | | |
| | 0945 | POV-32B | | |
| | 1005 | POV-2732 | | |
| | 1010 | POV-27A | | |
| | 1015 | POV-27NSM | | |
| | 1118 | POV-17A | | |
| | 1127 | POV-17NSM | | |
| | 1133 | POV-22A | | |
| | 1141 | POV-1722 | | |
| | 1136 | POV-22B | | |
| | 1345 | POV-3742 | | |
| | 1333 | POV-37NSM | | |
| | 1325 | POV-37A | | |
| | 1335 | POV-37B | | |
| | 1300 | POV-42A | | |
| | 1305 | POV-42B | | |
| 10-16-06 | 1320 | POV-42NSM | | NO TBT |
| 10-17-06 | 1520 | POV-47A | | 10-16-06 |
| | 1525 | POV-47B | | COC 10-18-06 |
| | 1540 | POV-47NSM | | |
| | 1516 | POV-48A | | |
| | 1523 | POV-48B | | |
| | 1535 | POV-4748 | | |
| 10-17-06 | 1035 | POV-41A | | COC 10-18-06 |
| | 1040 | POV-41B | | |
| | 1050 | POV-3641 | | |
| | 1043 | POV-36A | | |
| | 1055 | POV-36B | | |

Port of Vancouver Gateway Expansion
Sediment Sample Log
October 2006

3

| Date | Sample Time | Sample | Interval (ft) | Notes |
|----------|-----------------|--------------------|---------------|-----------------------------|
| 10-17-06 | 1005 | POV-11A | | repeated on list |
| | 1040 | POV-11B | | |
| | 1050 | POV-30A | | |
| | 1043 | POV-30A | | |
| | 1045 | POV-30B | | |
| | 1128 | POV-31A | | COC 10-18-06 |
| | 1130 | POV-31B | | |
| | 1135 | POV-26A | | |
| | 1140 | POV-26B | | |
| | 1150 | POV-2631 | | |
| | 1238 | POV-16A | | |
| | 1243 | POV-16B | | |
| | 1248 | POV-21A | | |
| | 1251 | POV-21B | | |
| | 1256 | POV-1621 | | |
| | 1413 | POV-15A | | |
| | 1417 | POV-15B | | |
| | 1422 | POV-15C | | |
| | 1420 | POV-20A | | |
| | 1425 | POV-20B | | |
| | 1427 | POV-1520 | | |
| | 1534 | POV-35A | | COC 10-19-06 #1 (Senvey) |
| | 1539 | POV-35B | | |
| | 1552 | POV-40A | | |
| | 1555 | POV-40B | | |
| | 1558 | POV-3540 | | |
| 10-18-06 | 1040 | POV-25A | | |
| | 1045 | POV-25B | | |
| | 1050 | POV-30A | | |
| | 1055 | POV-30B | | |
| | 1100 | POV-2530 | | |

Port of Vancouver Gateway Expansion
Sediment Sample Log
October 2006

④

| Date | Sample Time | Sample | Interval (ft) | Notes |
|----------|-------------|----------|-----------------------|--|
| 10-18-06 | 1155 | POV-34A | | COC 10-19-06 #1 Senvoy |
| | 1200 | POV-34B | | |
| | 1205 | POV-39A | | |
| | 1210 | POV-39B | | |
| | 1215 | POV-3439 | | |
| | 1303 | POV-13A | | |
| | 1305 | POV-13B | | |
| | 1310 | POV-18A | | |
| | 1312 | POV-18B | | |
| | 1315 | POV-1318 | | |
| | 1400 | POV-14A | | |
| | 1405 | POV-14B | | |
| | 1410 | POV-19A | | |
| | 1412 | POV-19B | | |
| | 1414 | POV-1419 | | |
| 10-19-06 | 0900 | POV-23A | | COC 10-19-06 #2 PMX dep off (JB) |
| | 0905 | POV-23B | | |
| | 0910 | POV-28A | | |
| | 0915 | POV-28B | | |
| | 0920 | POV-2328 | \$DUP | |
| | 0000 | POV-DUP | Duplicate of POV-2328 | |
| | 0955 | POV-33A | | |
| | 1000 | POV-33B | | |
| | 1005 | POV-38A | | |
| | 1010 | POV-38B | | |
| | 1015 | POV-3338 | | |
| | 1050 | POV-43A | | |
| | 1100 | POV-43B | | |
| | 1103 | POV-44A | | |
| | 1105 | POV-44B | | |
| | 1110 | POV-4344 | | |

Port of Vancouver Gateway Expansion
Sediment Sample Log
October 2006

5

| Date | Sample Time | Sample | Interval (ft) | Notes |
|----------|-------------|----------|---------------|--------|
| 10-19-06 | 1202 | POV-24A | | |
| | 1205 | POV-24B | | |
| | 1210 | POV-29A | | |
| | 1211 | POV-29B | | |
| | 1214 | POV-2429 | | |
| | 1312 | POV-45A | | |
| | 1315 | POV-45B | | |
| | 1320 | POV-46A | | |
| | 1321 | POV-46B | | |
| | 1325 | POV-4546 | | |
| | 1405 | POV-50A | | |
| | 1411 | POV-50B | | |
| | 1416 | POV-51A | | |
| | 1417 | POV-51B | | |
| | 1422 | POV-5051 | | |
| | 1451 | POV-49A | | |
| | 1500 | POV-49B | | |
| | 1503 | POV-52A | | |
| | 1505 | POV-52B | | |
| | 1508 | POV-4952 | | |
| | 1530 | POV-ER | | Rhsate |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

COC 10-19-06
#2 PMX dep
off (TB)

Chain of Custody Record

STL Seattle
5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com



Client: **Parametrix**
 Address: **700 NE Multnomah #1000**
 City: **PDX**
 State: **OR** Zip Code: **97232**
 Project Name and Location (State): **POV Gateway**
 Contract/Purchase Order/Quote No.: **274 4523 003**

Project Manager: **Andrew Sames**
 Telephone Number (Area Code)/Fax Number: **503 233 2400 / 233 4825**
 Site Contact: **A. Sames** Lab Contact: **K. Downie**
 Carrier/Maybill Number: **Parametrix dpp off**

Date: **10-13-06** Chain of Custody Number: **25313**
 Lab Number: _____ Page: **1** of **2**

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | Containers & Preservatives | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | |
|--|----------|------|--------|---------|------|-----|---------|----------------------------|------|-----|------|-----------|--|--|---------|
| | | | Air | Aqueous | Soil | Sed | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnAc/NaOH | | | |
| 1 POV-0308 | 10-12-06 | 1110 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 2 POV-03A | 10-13-06 | 1357 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 3 POV-03B | | 1406 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 4 POV-08A | | 1426 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 5 POV-08B | | 1435 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 6 POV-0510 | | 1255 | | X | | X | X | X | X | X | X | X | X | X | Archive |
| 7 POV-05A | 1314 | | X | | X | X | X | X | X | X | X | X | X | Archive | |
| 8 POV-05B | 1309 | | X | | X | X | X | X | X | X | X | X | X | Archive | |
| 9 POV-10A | 1326 | | X | | X | X | X | X | X | X | X | X | X | Archive | |
| 10 POV-10B | 1339 | | X | | X | X | X | X | X | X | X | X | X | Archive | |
| 11 POV-0409 | 1527 | | X | | X | X | X | X | X | X | X | X | X | Archive | |
| 12 POV-04A | 1609 | | X | | X | X | X | X | X | X | X | X | X | Archive | |

Analysis: **TOL, Sulfide, Brain Size, TSS, Solids, Ammonia, Nichls, Hg, SWA/Fresh/PCBs, Porewater TBT**

Sample Disposal: Return To Client Disposal By Lab Archive For: **2** Months

Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other

1. Relinquished By: **[Signature]** Date: **10-13-06** Time: **1700**

2. Relinquished By: _____ Date: _____ Time: _____

3. Relinquished By: _____ Date: _____ Time: _____

Comments: **3 cookies total**

Chain of Custody Record

STL Seattle
5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com



Client: Parametrix Date: 10-13-06 Chain of Custody Number: 25314
 Address: 700 NE Multnomah #1000 Lab Number: _____ Page 2 of 2
 City: PDX Site Contact: A. Jones Telephone Number (Area Code)/Fax Number: 503 233 2400 / 233 4825
 Project Name and Location (State): POV Gakeway Lab Contact: K. Downie

Contract/Purchase Order/Quote No.: 274 4523 003
 State: OR Zip Code: 97232
 Carrier/Waybill Number: _____

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | Containers & Preservatives | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | |
|--|----------|------|--------|---------|------|-----|----------------------------|-------|------|-----|------|--|--|-----------|
| | | | Air | Aqueous | Soil | Sed | Unpres | H2SO4 | HNO3 | HCl | NaOH | | | ZnAc/NaOH |
| 13) POV-04B | 10-12-06 | 1616 | | | | | X | | | | | | | Archive |
| 14) POV-09A | ↓ | 1505 | | | | | X | | | | | | | Archive |
| 15) POV-09B | ↓ | 1539 | | | | | X | | | | | | | Archive |
| _____ | | | | | | | | | | | | | | |

Cooler: Yes No Cooler Temp: _____
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____
 Sample Disposal: Disposal By Lab Return To Client Archive For _____ Months
 (A fee may be assessed if samples are retained longer than 1 month)

QC Requirements (Specify):
 1. Relinquished By: _____ Date: 10-13-06 Time: 1700
 2. Relinquished By: _____ Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

Comments: 3 coolers total
 DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy
 STL8274-580(12/02)

Chain of Custody Record

STL Seattle
5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com



| | | | | | | | |
|---|--|---|--|---|--|--|--|
| Client Paramatrix | | Project Manager Andrew Sames | | Date 10-17-06 | | Chain of Custody Number 25311 | |
| Address 700 NE Multnomah #1000 | | Telephone Number (Area Code) Fax Number 503 963 7880 / 233 4825 | | Lab Number | | Page 1 of 3 | |
| City Portland | | Site Contact A. Sames | | Analysis (Attach list if more samples are needed) | | Special Instructions/ Conditions of Receipt | |
| Project Name and Location (State) POV Gateway, Vancouver WA | | Carrier/Waybill Number Sevroy carrier | | X TIC sulfate | | | |
| Contract/Purchase Order/Quote No. 274-4523-003 | | Lab Contact K. Dominic | | X Brain size | | | |
| | | | | X TIS % Solids | | | |
| | | | | X Ammonia | | | |
| | | | | X Meth. Hg | | | |
| | | | | X SVO/Lead/Hg | | | |
| | | | | X Powder TBT | | | |

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | | Containers & Preservatives | | | | | | Analysis | Special Instructions/ Conditions of Receipt | | |
|--|----------|------|--------|---------|------|------|---------|-------|----------------------------|-----|------|-----------|--|--|----------|--|---------|---------|
| | | | Air | Aqueous | Sed. | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnCl/NaOH | | | | | | |
| POV-0611 | 10-13-06 | 1517 | | | X | | | X | | | | | | | | | | |
| POV-06A | 10-17-06 | 1506 | | | X | | | X | | | | | | | | | | Archive |
| POV-06B | | 1511 | | | X | | | X | | | | | | | | | | Archive |
| POV-11A | | 1500 | | | X | | | | X | | | | | | | | | Archive |
| POV-11B | | 1513 | | | X | | | | X | | | | | | | | | Archive |
| POV-06NSM | | 1520 | | | X | | | | X | | | | | | | | | Archive |
| POV-0102 | | 1555 | | | X | | | | X | | | | | | | | | Archive |
| POV-01A | | 1624 | | | X | | | | X | | | | | | | | | Archive |
| POV-01B | | 1629 | | | X | | | | X | | | | | | | | | Archive |
| POV-02NSM | 1550 | | | X | | | | X | | | | | | | | | Archive | |
| POV-02A | 1545 | | | X | | | | X | | | | | | | | | Archive | |
| POV-0712 | 1815 | | | X | | | | X | | | | | | | | | Archive | |

Possible Hazard Identification:
 Non-Hazard
 Flammable
 Skin Irritant
 Poison B
 Unknown
 Return To Client
 Sample Disposal
 Disposal By Lab
 Archive For **2** Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required (business days):
 24 Hours
 48 Hours
 5 Days
 10 Days
 15 Days
 Other

QC Requirements (Specify):
 1. Relinquished By **[Signature]** Date **10-17-06** Time **1100**
 2. Relinquished By _____ Date _____ Time _____
 3. Relinquished By _____ Date _____ Time _____

Comments: **6 coolers total**

**Chain of
Custody Record**

STL Seattle
5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com



Client: **Parametrix** Project Manager: **Andrew Sames** Chain of Custody Number: **25302**
 Address: **700 NE Multnomah #1000** Telephone Number (Area Code) / Fax Number: **503 963 7890 / 233 2400** Date: **10-17-06**
 City: **Portland** Site Contact: **A. Sames** Lab Contact: **K. Dornic** Page: **2** of **3**
 Project Name and Location (State): **POV Gateway Vancouver WA** Carrier/Waybill Number: **Sandy**

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | Containers & Preservatives | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | |
|--|----------|------|--------|---------|-----|------|---------|----------------------------|------|-----|------|---------------|--|--|--------|
| | | | Air | Aqueous | Sol | Soil | Umpres. | H2SO4 | HNO3 | HCl | NaOH | ZnAc/ NaOH | | | |
| POV-07A5AA-e-M | 10-13-06 | 1810 | | X | | | | X | | | | | | | Archiv |
| POV-12A5AA-e-M | 10-13-06 | 1806 | | X | | | | X | | | | | | | Archiv |
| POV-32A5SM | 10-16-06 | 0935 | | X | | | | X | | | | | | | Archiv |
| POV-32A | | 0955 | | X | | | | X | | | | | | | Archiv |
| POV-32AB | | 0945 | | X | | | | X | | | | | | | Archiv |
| POV-2732 | | 1005 | | X | | | | X | | | | | | | 1005 |
| POV-27A | | 1010 | | X | | | | X | | | | | | | Archiv |
| POV-27A5SM | | 1015 | | X | | | | X | | | | | | | Archiv |
| POV-17A | | 1118 | | X | | | | X | | | | | | | Archiv |
| POV-17A5SM | | 1127 | | X | | | | X | | | | | | | Archiv |
| POV-23A | | 1133 | | X | | | | X | | | | | | | Archiv |
| POV-1722 | | 1141 | | X | | | | X | | | | | | | Archiv |

Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other

QC Requirements (Specify):

1. Relinquished By: *[Signature]* Date: **10-17-06** Time: **1100**

2. Relinquished By: _____ Date: _____ Time: _____

3. Relinquished By: _____ Date: _____ Time: _____

Comments: **6 coolers total**

DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

STL Seattle
5755 8th Street E
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com



Client: Parvaretni Project Manager: Andrew Spores Date: 10-17-06 Chain of Custody Number: 25307

Address: 700 NE Multnomah # 1000 Telephone Number (Area Code)/Fax Number: 503 963 7890 / 233 2400 Lab Number: 3 of 3

City: Portland State: OR Zip Code: 97232 Site Contact: A. Spores Lab Contact: K. Davis

Project Name and Location (State): POV Battery, Vancouver WA Carrier/Waybill Number: Senvey

Contract/Purchase Order/Quote No: 274-4523-003

| Sample ID and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | | Containers & Preservatives | | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | | |
|--|----------|------|--------|---------|-----|------|--------|-------|----------------------------|-----|------|-----------|---------|-----------|--|--|-------------|-----------------|
| | | | Air | Aqueous | Sed | Soil | Unpres | H2SO4 | HNO3 | HCl | NaOH | ZnAc/NaOH | Ammonia | Meals, Hg | | | SVC/BAT/PLB | Precipitate/TBT |
| POV- 22B | 10-16-06 | 1336 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 3742 | | 1345 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 374NSM | | 1333 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 37A | | 1325 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 37B | | 1335 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 42A | | 1300 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 42B | | 1305 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 42NSM | | 1320 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Archive |

Disposal By Lab: Disposal By Client: Return To Client: Months: 2

Possible Hazard Identification: Non-Hazard, Flammable, Skin Irritant, Poison B, Unknown

QC Requirements (Specify): 15 Days

Turn Around Time Required (business days): 24 Hours, 48 Hours, 5 Days, 10 Days, 15 Days, Other

1. Relinquished By: [Signature] Date: 10-17-06 Time: 1100

2. Relinquished By: _____ Date: _____ Time: _____

3. Relinquished By: _____ Date: _____ Time: _____

Comments: 6 coolers 2044/

Chain of Custody Record

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Client: Parametrix Project Manager: Arthur Somes Date: 10-18-06 Chain of Custody Number: 25303
 Address: 700 NE Multnomah #1000 Telephone Number (Area Code)/Fax Number: 503 963 7800/233 1825 Lab Number: _____ Page: 1 of 3
 City: Portland OR 97232 Site Contact: A. Somes Lab Contact: K. Domic Analysis (Attach list if more space is needed):
 Project Name and Location (State): POV Garvey, Vancouver, WA Carrier/Waybill Number: Senroy TLC SIFILE
 Contract/Purchase Order/Quote No.: 274 1523 003 Grain Size
TNS, % Solids
Ammonia
Meckle Hg
Silica/Fe/Si
Powder TBT

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | Containers & Preservatives | | | | | Special Instructions/ Conditions of Receipt | |
|--|----------|------|--------|---------|-----|------|----------------------------|-------|------|-----|------|--|--------------|
| | | | Air | Aqueous | Sed | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | | ZnCl/NaOH |
| POV-47A | 10-16-06 | 1520 | X | | X | | | X | | | | | Archive ↓ |
| POV-47B | 1525 | X | | X | | | X | | | | | | |
| POV-47NSM | 1540 | X | | X | | | X | | | | | | |
| POV-48A | 1516 | X | | X | | | X | | | | | | |
| POV-48B | 1523 | X | | X | | | X | | | | | | |
| POV-4748 | 1535 | X | | X | | | X | | | | | | |
| POV-41A | 10-17-06 | 1035 | X | | X | | | X | | | | Archive ↓ | |
| POV-41B | 1040 | X | | X | | | X | | | | | | |
| POV-3641 | 1050 | X | | X | | | X | | | | | | |
| POV-36A | 1043 | X | | X | | | X | | | | | | |
| POV-36B | 1045 | X | | X | | | X | | | | | | |
| POV-31A | 1128 | X | | X | | | X | | | | | | |

Cooler: Yes No Cooler Temp: _____ Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison-B Unknown Months: 2
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____
 Sample Disposal: Disposal By Lab Return To Client Archive For _____
 (A fee may be assessed if samples are retained longer than 1 month)
 QC Requirements (Specify):
 1. Relinquished By: Arthur Somes Date: 10-18-06 Time: 1130
 2. Relinquished By: _____ Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

Comments: _____
 DISTRIBUTION: WHITE - Stays with the Samples; CANVARY - Returned to Client with Report; PINK - Field Copy
 STL8274-580 (12/02)

Chain of Custody Record

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Client: **Parametrix** Project Manager: **Andrew Somes** Date: **10-18-06** Chain of Custody Number: **25304**

Address: **700 NE Multnomah #1000** Telephone Number (Area Code)/Fax Number: **503 963 7890/233 4825** Lab Number: **2** of **3**

City: **OR** State: **OR** Zip Code: **97232** Site Contact: **A. Somes** Lab Contact: **K. Downie**

Project Name and Location (State): **POV Gateway Vancouver, WA** Carrier/Waybill Number: **Seavoy**

Contract/Purchase Order/Quote No.: **274 4523 003**

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | | Containers & Preservatives | | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | | |
|--|----------|------|--------|---------|-----|------|--------|-------|----------------------------|-----|------|---------------|---|---|--|--|--|---------|
| | | | Air | Aqueous | Sed | Soil | Unpres | H2SO4 | HNO3 | HCl | NaOH | ZnAc/ NaOH | | | | | | |
| POV-31B | 10-17-06 | 1130 | | | X | X | X | X | X | X | X | X | X | X | X | X | TOL, Salt, Hg Grain Size TUS 1/2 SLDS Ammonia Methyl Hg SWA Pres/Pres Drometr-TB | Archive |
| POV-26A | | 1135 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-26B | | 1140 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-2631 | | 1150 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-16A | | 1238 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-16B | | 1243 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-21A | | 1248 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-21B | | 1251 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-1621 | | 1256 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-15A | | 1413 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-15B | | 1417 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |
| POV-15C | | 1422 | | | X | X | X | X | X | X | X | X | X | X | X | X | | Archive |

Cooler: Yes No Cooler Temp: _____ Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown Sample Disposal: Disposal By Lab Return To Client Archive For _____ Months

Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____

QC Requirements (Specify): _____

1. Relinquished By: *[Signature]* Date: **10-18-06** Time: **1130**

2. Relinquished By: _____ Date: _____ Time: _____

3. Relinquished By: _____ Date: _____ Time: _____

Comments: _____

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SEVERN
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STL®

Client: **Parametrix** Project Manager: **Andrew Somes** Date: **10-18-06** Chain of Custody Number: **25315**
 Address: **700 NE Multnomah #1000** Telephone Number (Area Code)/Fax Number: **503 963 7840 / 233 4825** Lab Number: **3** of **3**
 City: **PDX** State: **OR** Zip Code: **97232** Site Contact: **A. Somes** Lab Contact: **K. Domic**
 Project Name and Location (State): **POV Oakway** Carrier/Waybill Number: **Sevnoy**
 Contract/Purchase Order/Quote No.: **274 4523 003**

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | | | Containers & Preservatives | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | |
|--|-----------------|-------------|--------|----------|------|---------|----------|------|-----|----------------------------|-----------|--|--|--|---|----------------|
| | | | Air | Aqueous | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnAc/NaOH | | | | | |
| POV-20A | 10-17-06 | 1420 | | X | | | X | | | | | | | | TUS % Solids Bath Size Ammonia Metals Hg SUC/Fer/MS Precip-TBT | Archive |
| POV-20B | | 1425 | | X | | | X | | | | | | | | | Archive |
| POV-1520 | | 1427 | | X | | | X | | | | | | | | | |

QC Requirements (Specify):
 1. Received By: **10-18-06 1130** Date: **10-18-06** Time: **1130**
 2. Relinquished By: _____ Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

Comments: _____

Disposal: Disposal By Lab Return To Client Archive For _____ Months
 (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____

Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown

Cooler: Yes No. Cooler Temp: _____

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Client: Paracetix Project Manager: Asher Sones Chain of Custody Number: 25305
 Address: 700 NE Mulholland #1000 Telephone Number (Area Code)/Fax Number: 503 233 2100 / 233 1825
 City: PDX State: OR Zip Code: 97232 Site Contact: A. Sones Lab Contact: K. Downie Page: 1 of 2
 Project Name and Location (State): POV Gateway Carrier/Voybill Number: Seavoy

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | Containers & Preservatives | | | | Special Instructions/ Conditions of Receipt | | | | | | | |
|--|----------|------|---------|-----|---------|-------|----------------------------|-----|------|---------------|--|---------|---------|---------|---------|---------|---------|---------|
| | | | Aqueous | Sol | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnAc/ NaOH | | | | | | | | |
| POV-35A | 10-17-06 | 1534 | X | | X | | | | | | | Archive | | | | | | |
| POV-35B | | 1539 | X | | X | | | | | | Archive | | | | | | | |
| POV-40A | | 1552 | X | | X | | | | | | | | Archive | | | | | |
| POV-40B | | 1555 | X | | X | | | | | | | | | Archive | | | | |
| POV-3540 | | 1558 | X | | X | | | | | | | | | | Archive | | | |
| POV-25A | 10-18-06 | 1040 | X | | X | | | | | | | | | | | Archive | | |
| POV-25B | | 1045 | X | | X | | | | | | | | | | | | Archive | |
| POV-30A | | 1050 | X | | X | | | | | | | | | | | | | Archive |
| POV-30B | | 1055 | X | | X | | | | | | | | | | | | | |
| POV-2530 | | 1100 | X | | X | | | | | | | Archive | | | | | | |
| POV-34A | | 1155 | X | | X | | | | | | Archive | | | | | | | |
| POV-34B | | 1200 | X | | X | | | | | | | | Archive | | | | | |

Analysis (Attach list if more space is needed):
TC, S.H.I.L.E.
(Grain Size)
TVS, % Solids
AMMONIA
Metals, Hg
SVA/First/Reb
Pesticides-TBT

Sample Disposal: Disposal By Lab Return To Client Archive For: 2 Months
 Possible Hazard Identification: Non-Hazard Flammable Skm Irritant Other

QC Requirements (Specify):
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other

1. Relinquished By: [Signature] Date: 10-19-06 Time: 1130
 2. Relinquished By: _____ Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

Comments: 5 coolers
 DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy

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Chain of Custody Record

Client: **Parametrix** Project Manager: **Andrew Somes** Date: **10-19-06** Chain of Custody Number: **25306**
 Address: **700 NE Multnomah # 1000** Telephone Number (Area Code)/Fax Number: **503 233 2400/233 1825** Lab Number: **2** of **2**
 City: **POD** State: **OR** Zip Code: **97232** Site Contact: **A Somes** Lab Contact: **K. Downie**
 Project Name and Location (State): **POV Gateway** Carrier/Waybill Number: **Seaway**

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | | Containers & Preservatives | | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt |
|--|----------|-------------|--------|---------|-----|------|---------|-------|----------------------------|-----|------|---------------|--|--|--|---|
| | | | Air | Aqueous | Sed | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnAc/ NaOH | | | | |
| POV-39A | 10-18-06 | 1205 | X | | | | | X | | | | | | | | Archival |
| POV-39B | | 1210 | X | | | | | X | | | | | | | | Archival |
| POV-3439 | | 1215 | X | | | | | X | | | | | | | | Archival |
| POV-13A | | 1303 | X | | | | | X | | | | | | | | Archival |
| POV-13B | | 1305 | X | | | | | X | | | | | | | | Archival |
| POV-18A | | 1310 | X | | | | | X | | | | | | | | Archival |
| POV-18B | | 1312 | X | | | | | X | | | | | | | | Archival |
| POV-1318 | | 1315 | X | | | | | X | | | | | | | | Archival |
| POV-14A | | 1400 | X | | | | | X | | | | | | | | Archival |
| POV-14B | | 1405 | X | | | | | X | | | | | | | | Archival |
| POV-19A # POV-19B | | 1410 & 1412 | XX | | | | | X | | | | | | | | Archival - 2 samples on same line to save coils |
| POV-1419 | | 1414 | X | | | | | X | | | | | | | | Archival |

Cooler: Yes No Cooler Temp: _____ Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown Return To Client Sample Disposal: Disposal By Lab Archive For: **2** Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____

QC Requirements (Specify): _____

1. Relinquished By: *Shane Hume* Date: **10-19-06** Time: **1130**

2. Relinquished By: _____ Date: _____ Time: _____

3. Relinquished By: _____ Date: _____ Time: _____

Comments: **5 coolers**

DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy

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Chain of Custody Record

Client: Parametrix Project Manager: Andrew Somes Date: 10-19-06 Chain of Custody Number: 26276
 Address: 700 NE Multnomah #1000 Telephone Number (Area Code)/Fax Number: 505 963 7890/233 2400 Lab Number: _____ Page 1 of 4
 City: PDX Site Contact: A. Somes Lab Contact: K. Dornie Analysis (Attach list if more space is needed):
 Project Name and Location (State): POV Gateway Carrier/Waybill Number: PMX drop off - (JB) TDS 50/50
 Contract/Purchase Order/Quote No.: 274 4523 003 Containers & Preservatives: _____

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | Containers & Preservatives | | | | | Special Instructions/ Conditions of Receipt | | |
|--|----------|------|--------|---------|-----|------|---------|----------------------------|------|-----|------|-----------|--|--|---------|
| | | | Air | Aqueous | Sol | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | ZnCl/NaOH | | | |
| POV- 23A | 10-19-06 | 0900 | X | | | | | X | | | | | | | Archive |
| POV- 23B | | 0905 | X | | | | | X | | | | | | | Archive |
| POV- 28A | | 0910 | X | | | | | X | | | | | | | Archive |
| POV- 28B | | 0915 | X | | | | | X | | | | | | | Archive |
| POV- 2328 | | 0920 | X | | | | | X | | | | | | | Archive |
| POV- 33A | | 0955 | X | | | | | X | | | | | | | Archive |
| POV- 33B | | 1000 | X | | | | | X | | | | | | | Archive |
| POV- 38A | | 1005 | X | | | | | X | | | | | | | Archive |
| POV- 38B | | 1010 | X | | | | | X | | | | | | | Archive |
| POV- 3338 | | 1015 | X | | | | | X | | | | | | | Archive |
| POV- DWP | | 0000 | X | | | | | X | | | | | | | Archive |
| POV- 43A | | 1050 | X | | | | | X | | | | | | | Archive |

Cooler: Yes No Cooler Temp: _____
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown Return To Client Archive For _____ Months
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____
 Sample Disposal: Disposal By Lab (A fee may be assessed; if samples are retained longer than 1 month)

QC Requirements (Specify): _____
 1. Relinquished By: [Signature] Date: 10-19-06 Time: 1715
 2. Relinquished By: [Signature] Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

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Chain of Custody Record

Client: Parametrix Project Manager: Andrew Somes Date: 10-19-06 Chain of Custody Number: 25308
 Address: 700 NE Multnomah #1000 Telephone Number (Area Code)/Fax Number: 503 963 7890/233 1825 Lab Number: _____ Page 2 of 4
 City: PDX State: OR Zip Code: 97232 Site Contact: A. Somes Lab Contact: K. Dornic Analysis (Attach list if more space is needed):
 Project Name and Location (State): POV Gateway Carrier/Waybill Number: PMX drop off (JB) TDS, % Solids, Ammonia, Metals, Hg, Silica, P, B, Polynuclear TST
 Contract/Purchase Order/Quote No.: 274 4523 003 Containers & Preservatives: HNO3, HCl, NaOH, ZnAc, NaOH

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | Containers & Preservatives | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt | |
|--|----------|------|--------|---------|------|---------|----------------------------|------|-----|------|--|--|-----------|
| | | | Air | Aqueous | Soil | Unpres. | H2SO4 | HNO3 | HCl | NaOH | | | ZnAc/NaOH |
| POV- 43B | 10-19-06 | 1100 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 44A | 10-19-06 | 1103 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 44B | | 1105 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 4344 | | 1110 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 24A | | 1202 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 24B | | 1205 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 29A | | 1210 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 29B | | 1211 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 2429 | | 1214 | X | X | X | X | X | X | X | X | X | X | Archive |
| POV- 45A | 1312 | X | X | X | X | X | X | X | X | X | X | Archive | |
| POV- 45B | 1315 | X | X | X | X | X | X | X | X | X | X | Archive | |
| POV- 46A | 1320 | X | X | X | X | X | X | X | X | X | X | Archive | |

Cooler: Yes No Cooler Temp: _____ Possible Hazard Identification: Non-Hazard Flammable Skm Irritant Poison B Unknown Other _____
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____
 Sample Disposal: Return To Client Return To Lab Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

QC Requirements (Specify): _____
 1. Relinquished By: [Signature] Date: 10-19-06 Time: 1715
 2. Relinquished By: [Signature] Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____

Chain of Custody Record

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Client: Parametrix Project Manager: Andrew Somes Date: 10-19-06 Chain of Custody Number: 25309
 Address: 700 NE Multnomah #1000 Telephone Number (Area Code)/Fax Number: 503 963 7890 / 233 4825 Lab Number: _____
 City: PDX State: OR Zip Code: 97232 Site Contact: A. Somes Lab Contact: K. O'Quinn Page: 3 of 4
 Project Name and Location (State): POV gateway Carrier/Waybill Number: PMX dropoff (JB)
 Contract/Purchase Order/Quote No.: 274 1523 003

| Sample I.D. and Location/Description (Containers for each sample may be combined on one line) | Date | Time | Matrix | | | | | Containers & Preservatives | | | | | Analysis (Attach list if more space is needed) | Special Instructions/ Conditions of Receipt |
|--|----------|------|--------|---------|------|--------|-------|----------------------------|-----|------|-----------|--|--|--|
| | | | Air | Aqueous | Soil | Unpres | H2SO4 | HNO3 | HCl | NaOH | ZnAc/NaOH | | | |
| POV-46B | 10-19-06 | 1321 | X | | | X | X | | | | | | TLC Sulfide Gain Site TSS % Solids Ammonia Nickels Hg SNO/Pret/PBS Borewater TBS | Archive |
| POV-4546 | | 1325 | X | | | X | X | | | | | | | Archive |
| POV-50A | | 1405 | X | | | X | X | | | | | | | Archive |
| POV-50B | | 1411 | X | | | X | X | | | | | | | Archive |
| POV-51A | | 1416 | X | | | X | X | | | | | | | Archive |
| POV-51B | | 1417 | X | | | X | X | | | | | | | Archive |
| POV-5051 | | 1422 | X | | | X | X | | | | | | | Archive |
| POV-49A | | 1451 | X | | | X | X | | | | | | | Archive |
| POV-49B | | 1500 | X | | | X | X | | | | | | | Archive |
| POV-52A | | 1503 | X | | | X | X | | | | | | | Archive |
| POV-52B | | 1505 | X | | | X | X | | | | | | | Archive |
| POV-4952 | | 1508 | X | | | X | X | | | | | | | Archive |

Cooler: Yes No Cooler Temp: _____ Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison B Unknown Return To Client Archive For _____ Months
 Sample Disposal: Disposal By Lab (A fee may be assessed if samples are retained longer than 1 month)
 Turn Around Time Required (business days): 24 Hours 48 Hours 5 Days 10 Days 15 Days Other _____
 QC Requirements (Specify): _____
 1. Relinquished By: _____ Date: 10-19-06 Time: 1715
 2. Relinquished By: Andrew Somes Date: _____ Time: _____
 3. Relinquished By: _____ Date: _____ Time: _____
 Comments: _____
 1. Received By: Andrew Somes Date: 10-19-06 Time: 17:15
 2. Received By: _____ Date: _____ Time: _____
 3. Received By: _____ Date: _____ Time: _____

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JTB/SC/BJ/DD
 Station Location: Extreme down-stream end of project site in Columbia River Station ID: POV-01

Coordinates:

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.7991 N</u> | <u>122° 45.8444 W</u> |

 @ 09:37

Measured Water Depth: 39.6' (Leadline) Sounder / Other _____

Vertical Datum: +2.29 (MLLW / MLW / Other ICRD)

Mudline Elevation: -37.31'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 10" Percent Recovery 70%

Core/Drive Comments: 5' 2" open / Fine to Med. Grain Size + small gravel/med - sub-angular. Harder material at ≈ 10.5'

SEDIMENT CORE PROCESSING:

2 core sections
0-4', 4-8' 6"

Processors: ASomes M/Marshall

Date: 10/13/06

Geologist: VMS Marshall

| Core Section(s) | Depth (sft) # | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|---------------|--|--------------------|
| | 0 <> 1.5 | Sand ^(SP) 95% fine grained sand, 5% fines, medium gray, loose, stiff, composed of lithic? and mineral fragments, micaceous, moderate sorting | |
| | 1.5 <> 1.9 | Sand ^(SW) 90% fine grained sand, 5% medium grained sand, composed of lithic and mineral fragments (Cinder/Basalt/Quartz + feldspars mics) micaceous, subrounded trace fine gravel, subrounded to subangular (lithic) trace fine s, trace coarse grained sand, poorly sorted | |
| | 1.9 <> 6.6 | sand (SP) 95% fine grained sand 5% fines, same as 0-1.5 feet | |
| | 6.6 <> 8.4 | Sand (SW) same as 1.5-1.9 trace coarse grained sand | |
| | <> | | |
| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/00

Samplers: JB/SC/BJ/DD

Station Location: Extreme downstream end of project site - outside edge of dredge area

Station ID: POV-02

Coordinates:

| Latitude/Northing | Longitude/Easting |
|-------------------|-------------------|
| 45° 39.7460N | 122° 45.9197W |

@ 10:15

Measured Water Depth: -49.1' (Leadline / Sounder / Other _____)

Vertical Datum: +2.76 (MLLW / MLW / Other +1-CRD)

Mudline Elevation: -46.34

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 3"

Percent Recovery 73 (%)

Core/Drive Comments: 4' 9" open / Fine - Med sand / less gravel than before.

SEDIMENT CORE PROCESSING:

Date: 10/13/04

2 core sections
0-4', 4-8.8'

Processors: ASomes, MS Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|------------|---|--------------------|
| 0 <> 1.5 | <> | Sand (SW) 85% Fine grained sand, 10% medium grained sand consists of lithic and mineral fragments (Cinder + Basalt / Quartz, Feldspar, mica) subrounded to subangular micaceous, medium gray loose, stiff poorly sorted + trace fine gravel and coarse sand, sub rounded sub angular, trace fines | |
| 1.5 <> 5.3 | <> | Sand (SP) 90% Fine grained sand, 5% fines medium gray, loose, stiff, trace medium gray sand (Cinder + Basalt / Quartz Feldspar / mica) sub rounded | |
| 5.3 <> 8.8 | <> | Sand (SW) 85% Fine grained sand, 10% medium grained sand consist. of same material as 0-1.5 ft, trace fine gravel / medium grained sand of same material as 0-1.5 trace fines, alternating thin beds of fine to coarse medium grained sand, upward fining | |
| | <> | | |
| | <> | | |

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/SC/BJ/DD

Station Location: Moving offshore from proposed pier headline in 13' ADP of column of DMW in dredge area downstream - end of project. Station ID: POV-03

| | | |
|--------------|----------------------|-----------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| <u>09:53</u> | <u>45° 39.7732 N</u> | <u>122° 45.7563 W</u> |

Measured Water Depth: - 32.7 (Leadline / Sounder / Other _____)

Vertical Datum: + 3.18 (MLLW / MLW / Other ICRD @ 09:45)

Mudline Elevation: - 29.52

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8.0' Percent Recovery 63 (%)

Core/Drive Comments: 6.0' Open/ Core material appears to be well-washed grey and red sand / med. fine to medium sand with coarser material including small gravel / lots of water in core material - sand not compacted at all.

SEDIMENT CORE PROCESSING:

Date: 10/12/06 2 core sections Processors: A. Gomes, M. Marshall
0-4' / 4'-7'
 Geologist: M.S. Marshall

| Core Section(s) | Depth (s/m) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-----------------------|--|--------------------|
| | <u>0 <> 7.4</u> | <u>Sand 98% fine grained, 2% medium grained sand, medium gray, loose, stiff micaceous, trace fine gravel, medium grained sand consist of lithic and mineral fragments, (Cinder basalt / Quartz, feldspar, mica) subrounded, no appreciable fines gravel consists of lithic lithic lithic fragments and are subrounded to subangular, clam observed at 1 foot below surface,</u> | |
| | <u><></u> | | |

SEDIMENT CORE SAMPLING:

Date: 10/11/06 Samplers: JB/SC/BJ/DD
 Station Location: moving offshore in 1st column of DMMU at PDV - 0 downstream end of dredge area Station ID: PDV-04

Coordinates: 12:25

| Latitude/Northing | Longitude/Easting |
|---------------------|-----------------------|
| <u>45° 39.7697N</u> | <u>122° 45.7784 W</u> |

Measured Water Depth: -36.5' (Leadline / Sounder / Other _____)
 Vertical Datum: +2.43 (MLLW / MLW / Other ICRD @ 12:30)
 Mudline Elevation: -34.07'

Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 8' 8" Percent Recovery 68 (%)

Core/Drive Comments: 5' 4" Open / fine to med. sand / very wet core, material not compacted

SEDIMENT CORE PROCESSING:

Date: 10/12/06 Reet Processors: A. Somes, MS, Marshall
2 core sections 0-4' / 4-8' 3" Geologist: MS Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|------------|---|--------------------|
| | 0 < > 7.5 | <u>Sand</u> 98% fine grained sand, 2% medium grained sand lenses, loose, stiff, micaceous, medium grained sand consists of lithic and mineral fragments (Cinder/basalt/Quartz + feldspar + mica) rounded to subrounded, trace fine gravel, consist of lithic fragments, rounded to subrounded | |
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PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/11/06

Samplers: JB/SC/BT/DD

Station Location: Downstream end of project - 3rd row of dunn
3rd row from proposed pier head line

Station ID: POV-05

Coordinates:

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.7588 N</u> | <u>122° 45.8013 W</u> |

14:30

Measured Water Depth: -40.0' (Leadline / Sounder / Other _____)

Vertical Datum: +1.81 (MLLW / MLW / Other: ICRD @ 14:30)

Mudline Elevation: -38.19

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 4"

Percent Recovery 74 (%)

Core/Drive Comments: 4' 8" ^{fine to} open / med. sand, unconsolidated with coarser material as before - lots of water in sample.

SEDIMENT CORE PROCESSING:

Date: 10/12/06 8ect

3 core sections
0'4'14" - 7'17" - 8'11"

Processors: ASomes / Marshall

Geologist: M Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-----------------------|--|--------------------|
| | <u>0 <> 8.4</u> | <u>sand 98% fine grained sand 2% fine gravel, loose stiff, M'aceous medium gray, gravel consists of lithic fragment sand are rounded</u> | |
| | <> | | |
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| | <> | | |
| | <> | | |

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/SC/BJ/DD
 Station Location: Downstream end of projectsite - moving from in shore to out shore edge Station ID: P0V-06
 Coordinates:

| | |
|---------------------|----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45°39.7473 N</u> | <u>122°45.8309 W</u> |

 @ 10:52
 Measured Water Depth: -43.1 (Leadline) Sounder / Other _____
 Vertical Datum: +3.07 (MLLW / MLW) Other CRD
 Mudline Elevation: -40.03
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 8' 3" Percent Recovery 65 (%)
 Core/Drive Comments: 5' 9" Open / Fine to med. sand / small gravel - rounded.

SEDIMENT CORE PROCESSING:

Date: 10/13/06 Processors: Asomes, MS Marshall
2 core sections 0'-4', 4'-7' 9" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--------------------|
| | 0 < > 1.2 | Sand (SP) 95% Fine grained sand, medium gray, loose, stiff, consists of mineral and possible lithic fragments (Quartz, feldspar, mica) micaceous, 5% fines, clam @ 0.5 feet | |
| | 1.2 < > 4.3 | Sand (SW) 90% Fine grained sand, 10% medium grained sand, consists of lithic and mineral fragments (minerals, basalt, quartz, feldspar, mica) subrounded to subangular tan micaceous, medium gray, loose, stiff, trace fine gravel (lithics) subrounded to subangular, poorly sorted trace fines | |
| | 4.3 < > 5.4 | Sand (SP) 95% Fine grained sand, medium gray loose, stiff, consists of same material as D-1.2 feet | |
| | 5.4 < > 6.3 | Sand (SW) 90% Fine grained sand, 5% medium grained sand, 5% fine gravel, material and shape same as 1.2-4.3 feet, very poorly sorted, medium gray, loose, stiff, trace fines | |
| | 6.3 < > 7.7 | Sand (SW) 80% Fine grained sand, 15% medium grained sand, material and shape same as above 1.2-4.3 feet, 5% coarse grained sand, poorly sorted, medium gray, loose, stiff Alternating thin beds of finer to more coarse sand grain sizes | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/SC/BJ/DD

Station Location: Downstream end of project site in the Columbia River Station ID: POV-07

| | | | |
|--------------|----------------------|-----------------------|---------|
| Coordinates: | Latitude/Northing | Longitude/Easting | © 12:00 |
| | <u>45° 39.7423 N</u> | <u>122° 45.8837 W</u> | |

Measured Water Depth: -47.8 (Leadline) / Sounder / Other _____

Vertical Datum: +2.93 (MLLW / MLW) (Other ±CRD)

Mudline Elevation: -44.87

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 11" Percent Recovery 70 (%)

Core/Drive Comments: 5' 1" open / same sands as before on top / some silt noted at cut between core sections A-B.

SEDIMENT CORE PROCESSING:

2 core sections
0-4, 4-8' 6"

Processors: Somos MS Marshall

Date: 10/13/06

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--------------------|
| | 0 < > 3.4 | Sand (SW) 85% Fine grained sand, 10% medium grained sand, consists of mineral and lithic fragments (cinder/basalt/Quartz feldspar mica) micaceous medium gray, loose, stiff, subrounded to subangular | |
| | < > | 5% fine gravel, subrounded (lithic), trace fines poorly sorted | |
| | 3.4 < > 4.4 | Silt (ML) medium gray, loose, soft | |
| | | Sharp contact above and below, very low plasticity | |
| | 4.4 < > 5.9 | Sand (SW) 80% Fine grained sand, 10% medium grained sand (same material and shape as 0-3.4 ft) 5% coarse grained sand (same material and shape as 0-3.4) trace fine gravel | |
| | < > | Fines upward fining, coarse sand @ 5.9 feet medium gray, loose, stiff, micaceous, moderately sorted | |
| | 5.9 < > 8.4 | Sand (SW) 90% Fine grained sand, 5% medium grained sand (same material and shape as 4.4-5.9), trace fine gravel, trace fines | |
| | < > | medium gray, loose, stiff, micaceous | |
| | < > | | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06

Samplers: JB/SC/BJ/DD

Station Location: Moving along 1st row of DMMU (upstream) next to proposed pier headline in dredge area

Station ID: POV-08

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 11:27 | 45° 39.716' N | 122° 45.713' W |

Measured Water Depth: Attempt 1 / Attempt 2
-32.2 / -32.2 (Leadline) Sounder / Other _____

Vertical Datum: + 2.84 (MLLW / MLW / Other \pm CRD @ 1/30)

Mudline Elevation: -29.36

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 9' 6" = 9' 7" Percent Recovery 76 (%)

Core/Drive Comments: 4' 5" Open/med. sand with some fines and also some coarser materials not well sorted / very wet core lots of water

SEDIMENT CORE PROCESSING:

Processors: MS Marshall, ASome

Date: 10/12/06 port

Geologist: MS Marshall

| Core Section(s) | Depth (sin) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-------------|---|--------------------|
| | 0 <> 7.5 | Sand 98% Fine grained sand, 2% medium grained sand, loose stiff micaceous, medium grained sand consists of lithic and mineral fragments (cinder/basalt/Quartz Feldspar, mica) subrounded no appreciable fines | |
| | <> | | |
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SEDIMENT CORE SAMPLING:

Date: 10/11/06 Samplers: JB/SC/BJ/DD

Station Location: Downstream end of dredge area
2nd column of DMNH (2nd from downstream end of dredge area) Station ID: PDV-09

| | | |
|--------------|----------------------|-----------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| <u>13:47</u> | <u>45° 39.7082 N</u> | <u>122° 45.7348 W</u> |

Measured Water Depth: 45.0' - 38.0' (Leadline / Sounder / Other _____)

Vertical Datum: +2.01 (MLLW / MLW / Other ±CRD 1345)

Mudline Elevation: -35.98

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 10" Percent Recovery: 70 (%)

Core/Drive Comments: 5' 2" fine to open med. sand, wood chips on surface of the core and in core trace

SEDIMENT CORE PROCESSING:

Date: 10/12/06 see 2 core sections 0-4' 4" - 8' 5" Processors: ASomes M Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|------------|--|--------------------|
| | 0 < > 8.2 | Sand 98% Fine grained sand, 2% medium grained sand lenses, loose, stiff, micaceous, medium grained sand consists of lithic and mineral fragments (Cinder + brick + Feldspar, + Quartz + mica) subrounded trace fine gravel consist of lithic fragments rounded to subrounded | |
| | < > | 4 inch lense of organic debris with wood fragments at | |
| | < > | 6 feet below surface/mudline | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/11/06 Samplers: JB/SC/BJ/DD

Station Location: Downstream end of project site - 3rd row of DMMU from proposed pier leadline. Station ID: POV-10

Coordinates:

| | |
|----------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45° 39.6999 N</u> | <u>122° 45.7566 W</u> |

Core 2

Measured Water Depth: -34.8' (Leadline / Sounder / Other _____)

Vertical Datum: +1.49 (MLLW / MLW / Other ICRD@)

Mudline Elevation: -33.31

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 3" Percent Recovery 65 (%)

Core/Drive Comments: Poor recovery on tray 1 / Core 2 - 5' 9" Open / fine to med sand as before - lots of water in core material

SEDIMENT CORE PROCESSING:

Date: 10/12/06 Processors: Asomes, MS Marshall
2 core sections 0-4' / 4'-7'10" Geologist: MS Marshall

| Core Section(s) | Depth (in ^{feet}) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-----------------------------|--|--------------------|
| | 0 <> 7.5 | <u>Sand</u> 98% fine grained sand, 2% fine gravel, gravel consists of lithic fragments, rounded loose, stiff, micaceous, medium gray | |
| | <> | | |
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| | <> | | |
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| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/SC/BJ/DD
 Station Location: POV-TT *Damstream end of project site in the Columbia River* Station ID: POV-11

Coordinates:

| | |
|----------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45° 31.6905 N</u> | <u>122° 45.7817 W</u> |

 @ 11:31

Measured Water Depth: -37.3' (Leadline / Sounder / Other _____)

Vertical Datum: +3.09 (MLLW / MLW / Other ± CRD)

Mudline Elevation: -34.21

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 9" Percent Recovery 69 (%)

Core/Drive Comments: 5' 3" Open / Material in core case - Fine sand not as coarse as material in top of case

SEDIMENT CORE PROCESSING:

Date: 10/13/06 *2 core sections 0-4' 4-8' 4"* Processors: ASomes MSMarshall
 Geologist: MSMarshall

| Core Section(s) | Depth (Feet) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| 0 < > 4.2 | | <u>Sand (SW) 90% Fine grained sand, 5% medium grained sand, subrounded, composed of lithic and mineral fragments (Cinder + Basalt / Quartz + Feldspar + mica) micaceous, 5% to trace coarse grained sand and fine gravel subrounded to subangular lithic fragments trace fines, poorly sorted, medium gray, loose, stiff</u> | |
| 4.2 < > 4.5 | | <u>Sand with gravel (SW) 80% Fine grained sand, 10% medium grained sand, consists of lithic and mineral fragments (Cinder + Basalt / Quartz + Feldspar + mica) micaceous, subrounded; 5% coarse grained sand, consist of same material that comprise medium grain sand material, 5% Fine gravel, lithic (intrusive and extrusive) fragments, rounded to subangular, poorly sorted, medium gray, loose, stiff</u> | |
| 4.5 < > 5.2 | | <u>Sand (SW) same as 0 to 4.2 Feet</u> | |
| 5.2 < > 5.6 | | <u>Sand (SW) 70% Fine grained sand, 25% medium grained sand, consists of same and material as described above; grades downward to coarser material, 5% coarse grained sand similar material and shape as described above alternating thin beds of medium to fine grained Sand F.F. - 5.8 poorly sorted, medium gray, loose stiff</u> | <u>Trace fine gravel subrounded to subangular Trace fines</u> |

5.6 - 7.5 Sand (SW) 90% Fine grained sand, 10% medium grained sand, same material and shape as described above; downward coarsening, trace gravel
 6.6-7.5 subrounded to subangular poorly sorted, medium gray
 Page 4 of 10 loose stiff

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/SC/BJ/DD
 Station Location: POV-12 Downstream end of project site in the Columbia River Station ID: POV-12

Coordinates:

| Latitude/Northing | Longitude/Easting |
|---------------------|-----------------------|
| <u>45° 39.6679N</u> | <u>122° 45.8422 W</u> |

CORE attempt 1 @ 12:43

Measured Water Depth: -49.9' (-49.8' Leadline / Sounder / Other) .6694 N = attempt 2, .8469 W - core attempt 2 @ 13:58

Vertical Datum: + 2.43' (MLLW / MLW / Other) ± CRD @ 14:00

Mudline Elevation: -47.37'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 6' 11" Percent Recovery 55 (%)

Core/Drive Comments: note water depth was -49' 9" for both core attempts
7' 1" Open / Fine - med to coarse sand / small, sub-angular gravel

SEDIMENT CORE PROCESSING:

2 core sections Processors: ASomes, MSMarshall

Date: 10/13/06 0-4', 4-6.7" Geologist: MSMarshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--------------------|
| | 0 < > 2.25 | Sand ^(SP) 95% Fine grained sand, 5% medium grained sand, trace fines, medium grained sand consists of lithic and mineral fragments, (cinders + basalt / quartz + feldsp, + mica) micaceous, subrounded trace coarse grained sand, subrounded to subangular lithic, moderately sorted, medium gray, loose, stiff | |
| | 2.25 < > 3.2 | Sand ^(SW) 75% Fine grained sand 15% Medium grained sand, 5% coarse grained sand, trace fine gravel trace fines, sand consists of same material and shape as 0-2.25, gravel is lithic and subrounded medium gray, loose, stiff, poorly sorted, wood debris micaceous | |
| | 3.2 < > 4.6 | Sand ^(SP) 90% Fine grained sand, 10% medium grained sand, sand consists of same material and shape as observed @ 2.2-3.2, medium gray, loose, stiff moderately sorted, micaceous | |
| | 4.6 < > 6.1 | Sand ^(SW) 75% Fine grained sand, 10% medium grained sand, 10% coarse grained sand, trace fine gravel, trace fines, sand and gravel consists of same material and shape as observed @ 2.2-3.2 | |

SEDIMENT CORE SAMPLING:

Date: 10 / 17 / 06 Samplers: JB/SC/BJ/DD
 Station Location: Moving into 1st row of dunn (next to proposed pier headline) in dredge area Station ID: POV-13

Coordinates: 11-32

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.6596 N</u> | <u>122° 45.6705 W</u> |

Measured Water Depth: -31.1' (Leadline / Sounder / Other _____)

Vertical Datum: +0.53 (MLLW / MLW (Other) ± CRD @ 11:30)

Mudline Elevation: -30.57'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 9' 11" Percent Recovery 78 (%)

Core/Drive Comments: 3 core sections
4' 1" Open / Medium sand - thin (1-2mm) larger fines on surface of core / medium sand at cut between sections B+C and again at cut between B+C / Coarser material in core here with medium sand. Not too much water in this core as in previous cores.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 Processors: K. Somes, M. Marshall
3 core sections 0-4' 1/4" - 8' 8" - 9' 6" Geologist: M. Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--|
| | 0 < > 5.9 | Sand (SP) 75-100% Fine grained sand, 0-25% medium grained sand, 0-25% fines medium grained sand consist of lithic and mineral fragments (cinolite/basalt/quartz felds par, mica) subrounded, medium gray, loose stiff, micaceous, moderate to well sorted | *Logging conducted according to LWB Guidelines for sediment sampling |
| | 5.9 < > 9.1 | Sand (SP) 50-75% Fine grained sand, 25-50% medium grained sand, 0-25% fines, 0-25% fine gravel, medium grained trace coarse sand medium grained sand consists of same material and shape as above, coarse grained sand is lithic and subangular, gravel is lithic (quartz) and subrounded to subangular, medium gray, loose, stiff, micaceous, well sorted, alternating thin beds of medium and coarse grained sand in between beds (5-20cm) of fine grained sand, gravel is found mostly with coarser sands, | (3-5cm) |
| | < > | | |
| | < > | | |
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PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06

Samplers: JB/SC/BJ/DD

Station Location: Mowing Dam stream in 2nd Row of PDMU in sedge area (2nd row from proposed pier headline)

Station ID: POV-~~4~~14

Coordinates:
10:59

| Latitude/Northing | Longitude/Easting |
|---------------------|----------------------|
| <u>45°39.6516 N</u> | <u>122°45.6900 W</u> |

Measured Water Depth: -33.5' (Leadline / Sounder / Other Hose mark)

Vertical Datum: +0.60' (MLLW / MLW / Other ±CRD)

Mudline Elevation: -32.9

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 7"

Percent Recovery 60 (%)

Core/Drive Comments: 4' ^{5"} Open / Medium sand - 1cm layer fines - brown silt / on surface of core / medium sand + med. at cut between A+B core sections / material appears dryer than previous cores - not as much water / core well - med. sand with various material mixed in.

SEDIMENT CORE PROCESSING:

Date: 10/18/06

2 core sections
0-4' / ~~4-8'~~ 4'-9'2"

Processors: ASomas, Paul

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 <> 6.3 | Sand (SP) 75-100% Fine grained sand 0-25% Fines, medium gray, loose, stiff micaceous, well sorted | *conducted in accordance to LWG Guidance for sediment sampling, Modified ASTM |
| | 6.3 <> 8.1 | Sand (SP) 75-100% Fine grained sand 0-25% medium grained sand, 0-25% Fines, medium grained sand consist of lithic and mineral fragments (cinder/basalt Quartz, Feldspar, mica) subrounded to subangular, alternating thin beds of (3-5cm) medium grained sand in between beds (5-20cm) of fine grained sand, contacts are sharp, medium gray, loose, stiff micaceous well sorted | |
| | 8.1 <> 9.8 | Sand (SW) 75-100% medium grained sand 80-75% 25-50% Fine grained sand, trace Fines, trace coarse grained sand trace fine gravel, medium grained sand consists of lithic and mineral fragments of same material and shape as above, coarse grained sand and gravel are lithic and subangular to subrounded, medium gray, loose stiff micaceous, moderate to poorly sorted | |
| | <> | | |
| | <> | | |

8.8

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BJ/PD
 Station Location: Moving inshore to 3rd row of pmmu in dredge area (3rd row from outside (offshore) edge of dredge area) Station ID: POV - POV-15
 Coordinates:

| | |
|--------------------------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>11:32</u> <u>45° 39.6428 N</u> | <u>122° 45.7120 W</u> |

 Measured Water Depth: -35.0 (Leadline / Sounder (Other) Hose mark)
 Vertical Datum: +0.62 (MLLW / MLW (Other) ICRD @ 11:30)
 Mudline Elevation: -34.38
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 10' 3" Percent Recovery 81 (%)

Core/Drive Comments: 3' 9" Open/Lots of small wood fragments on surface of core - medfine to medium sand / same sand at cut between core sections A+B and core nose / also some coarser material - sand and small gravel (worn + rounded) at cut and in core nose / same sand and coarse mixture at cut between B+C

SEDIMENT CORE PROCESSING:

Date: 10/17/06 feet 3 core sections 0-4'4" - 8'8" - 9'10" Processors: ASomes, MS Marshall
 Geologist: MS Marshall

| Core Section(s) | Depth (<g>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-------------|---|--|
| 0 | < > 0 | Sand (SP) 75-100% fine grained sand, 0-25% fines, trace medium grained sand, trace fine gravel, medium grained sand consists of lithic and mineral fragments (cinder/basalt/Quartz feldspar mica) subrounded, gravel consist of lithic subangular fragments (granite/basalt), medium gray, loose, stiff micaceous, moderate sorting | * logging conducted according to LWS section 4 sampling guidelines modified ASTM |
| 6 | 6.2 | Sand (SP) 75-100% medium grained sand 0-25% fine grained sand, trace fines, medium grained sand consist of lithic and mineral fragments of same material and shape as above, medium gray loose, stiff, micaceous, well sorted | |
| 6.2 | < > 8.7 | Sand (SP) 50-75% fine grained sand, 25-50% medium grained sand trace fine gravel, trace fines, medium grained sand consist of lithic and mineral fragments of same material and shape as 0-6, gravel consist of lithic (granite?) (reddish brown phaneritic) subangular fragments, medium gray loose stiff, micaceous, well sorted, alternating thin beds of medium grained sand in between beds (20-40cm) of fine grained sand | |
| 8.7 | 9.4 | Sand (SW) 50-75% fine grained sand, 50-25% medium grained sand, 0-25% coarse grained sand, trace fine gravel trace fines, medium grained sand consist of same material and shape as above coarse grained sand consist of lithic (cinder, basalt, granite?) subangular fragments, gravel are lithic subangular medium gray, coarse, stiff, micaceous, poorly sorted | |

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving downstream in the 2nd row of DMNH from outside (offshore) edge of the dredge area Station ID: P2V to P2V-16

Coordinates: 10:56

| | |
|----------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45° 39.6317 N</u> | <u>122° 45.7429 W</u> |

Measured Water Depth: -39.0' (Leadline / Sounder Other these Mark)
 Vertical Datum: +0.48 (MLLW / MLW / Other ±CRD @ 11:00)
 Mudline Elevation: -38.52
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 7' 7" Percent Recovery 60 (%)

Core/Drive Comments: 6' 5" Open/Hit harder material between -5 and -6 ft. and again at -11 ft / med-fine to medium sand with 1-2 mm layer of brown silt on surface of core / same sand with much more coarse material (coarse sand + gravel) at cut between core sections A+B / same description for material in core nose.

SEDIMENT CORE PROCESSING:

Date: 10/17/06 2 core sections Processors: ASones, I Saul, MSMarsha II
 Geologist: MSMarshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-------------------------------|-------------|--|--|
| | 0 < > 3.2 | Sand (SP) 75-100% fine grained sand, 0-25% medium grained sand, 0-25% fines, micaceous, medium gray, loose, stiff, medium grained sand consists of lithic and mineral fragments (limestone, quartz, feldspar, mica) sub rounded, moderate to poorly sorted | * logging conducted in accordance to LWG Sediment sampling Guidance, modified ASTM |
| | 3.2 < > 4 | sand (sw) 50-75% fine grained sand, 25-50% medium grained sand, trace coarse grained sand medium grained sand consists of lithic and mineral fragments of same material and shape as above, coarse grained sand consists of lithic fragments - granite/basalt, sub angular, poorly sorted | |
| large brick fragment @ 4 feet | 4 < > 5.6 | Sand (SP) 75-100% fine grained sand, 0-25% fines, trace medium grained sand, micaceous, medium gray, loose, stiff (saggy?) medium grained sand consists of lithic and mineral fragments of same material and shape as above, moderate to well sorted | |
| | 5.6 < > 6.9 | sand (sw) 50-75% fine grained sand, 25-50% medium grained sand, 0-25% fines, micaceous, medium gray, loose, stiff, medium grained sand consist of lithic and mineral fragments of same material and shape as above, more alternating thin beds (5-10 cm) of fine to medium grained sand | |

fine grained beds (10-30cm) dominate, contacts are gradational

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06 Samplers: JB/sc/BJ/DD
 Station Location: Downstream end of project, 1st row of DMWH from outside edge of dredge area (off shore) Station ID: POV-17

Coordinates: 14:43

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.6141 N</u> | <u>122° 45.7982 W</u> |

Measured Water Depth: -48.2' (Leadline / Sounder / Other _____)
 Vertical Datum: +2.22' (MLLW / MLW / Other ±CRD @ 14:45)
 Mudline Elevation: -45.98'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 7' 0" Percent Recovery _____ (%)
 Core/Drive Comments: 76" Open / Medium to coarse sand in core nose.

SEDIMENT CORE PROCESSING:

Date: 10/16/06 Processors: ASOMES, MSM Marshall
0-4.4' / 4.4' 6x3" 2 core sections Geologist: MSMarshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|--|--------------|---|--------------------|
| * Change logs to measure sediment distribution per LW guidance for sediment sampling method. | | | |
| | 0 <> 4 | Sand (SW) 75% fine grained sand, 50-25% medium grained sand 50-25% fines, medium grained sand consists of lithic and mineral fragments (cinder + basalt / quartz, feldspar, mica) subrounded, micaceous, medium gray, loose stiff, poorly sorted | |
| | 4 <> 5.6 | Sand (SW) 50-75% fine grained sand, 25-50% medium to coarse grained sand 25-50% fines, trace fine gravel, medium grained sand consists of lithic and mineral fragments, coarse grained sand and fine gravel are lithic, subrounded to subangular, micaceous, medium gray, loose, stiff, poorly sorted | |
| | 5.6 <> 6.6 | Sand (SW) 50-75% medium grained sand, 25-50% fine grained sand, 25-50% fines trace coarse grained sand, micaceous medium gray, loose, stiff medium grained sand consists of same material and shape as 0-4 feet coarse grained sand consist of subangular lithic fragments | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06 Samplers: JTB/SL/BJ/DD
 Station Location: Moving upstream along inner side of DMMU (next to proposed pier/berthline) in dredge area Station ID: POV-18

| | | |
|--------------|---------------------|----------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 12'08 | <u>45°39.5959 N</u> | <u>122°45.6201 W</u> |

Measured Water Depth: -28.8' (Leadline / Sounder / Other _____)
 Vertical Datum: +0.57' (MLLW / MLW / Other I CRD @) 12/15
 Mudline Elevation: -28.23'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 8' 9" Percent Recovery 77 (%)

Core/Drive Comments: 5' 3" open / medium sand with thin layer fine silt (1-2mm) on surface of core / Medium sand with coarser material - coarse sand + small gravel at cut between A + B core sections / material in core none the same as above.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 2 core sections Processors: A. Ames, MS Marshall
0-4' / 4'-8' 4" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 < > 2.6 | Sand (SP) 75-100% fine grained sand 0-25% Fines, trace medium grained sand Medium gray, loose, stiff, micaceous Moderate to well sorted, woo. | * Logging conducted according to LUG guidance for Sediment Sampling |
| | 2.6 < > 4 | Sand (SW) 75-100% Fine grained sand, 0-25% medium grained sand, 0-25% Fines 0-25% wood debris, medium grained sand consist of lithic and mineral fragments (cinder, basalt/quartz, feldspar, mica) subrounded to subangular, medium gray, loose, stiff micaceous, poorly sorted | |
| | 4 < > 5.6 | Sand (SP) 75-100% Fine grained sand 0-25% Fines, trace medium grained sand consist of lithic and mineral fragments of same material and shape as above medium gray, loose, stiff, micaceous well sorted | |
| | 5.6 < > 7.9 | Sand (SP) 50-75% medium grained Sand, 0-25% Fine grained sand, 0-25% Fines, trace coarse grained sand, medium grained sand consists of same material and shape as above (2.6-4 feet), coarse grained sand consists of lithic, subrounded to subangular fragments, medium gray, loose, stiff, micaceous sharp contact with layer above | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06 Samplers: JB/SC/BI/DA
 Station Location: Manning downstream in 2nd row of DMMH (2nd row from proposed pier head line) in dredge area Station ID: POV-19

| | | |
|--------------|---------------------|----------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 10:30 | <u>45°39.5903 N</u> | <u>122°45.6359 W</u> |

Measured Water Depth: -31.9' (Leadline / Sounder / Other _____)

Vertical Datum: +0.73' (MLLW / MLW / Other ICRD @ 10:30)

Mudline Elevation: -31.17'

Estimated Penetration: 12.8" Refusal: None

Total Core Length: 8' 8.4" Percent Recovery 66 (%)

Core/Drive Comments: 5' 8" Open / med sand with coarser sand + small gravel - especially in core nose Note 2nd layer - fine/brown silt on surface of core.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 Processors: Somer, T. Saul
2 core sections 0-4' / 4'-7' 11" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| 0 | < > 4.2 | Sand (SP) 75-100% Fine grained sand, 0-25% Fines, trace medium grained sand, medium grained sand consist of lithic and mineral fragments (cinder, basalt/Quartz, feldspar mica) subrounded, medium gray loose, stiff micaceous moderate to well sorted | * Logging conducted in accordance with LWG Sediment Sampling guidance Modified ASTM |
| 4.2 | 6.3 | Sand (SP) 50-75% Fine grained sand, 25-50% medium grained sand, 0-25% fines trace coarse grained sand, medium grained sand consist of lithic and mineral fragments of same material and shape as above, Alternating thin beds (5-10cm) of medium grained sand in between beds of (10-20cm) fine grained sand, contacts are sharp, beds are at an angle from the horizontal, medium gray, loose, stiff, micaceous, moderate to well sorted | |
| 6.3 | < > 7.5 | Sand (SW) 50-75% medium grained sand, 25-50% Fine grained sand, 0-25% fines trace coarse grained sand, trace fine gravel medium grained sand consists of lithic and mineral fragment of same material and shape as above, coarse grained sand consist of lithic subrounded and subangular fragments contact gradational from layer above, medium gray, loose, stiff, micaceous, moderate to well sorted | |

7.5

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06

Samplers: JB/SC/BJ/DD

Station Location: maining upstream in 3rd row of PMMU from outside (off shore) edge of dredge mark

Station ID: POV-20

Coordinates:

| Latitude/Northing | Longitude/Easting |
|-----------------------|------------------------|
| <u>45° 39.5834' N</u> | <u>122° 45.6565' W</u> |

Measured Water Depth: - 34' 4" (Leadline / Sounder / ~~Other~~) @ 1215

Vertical Datum: + 1.09 (MLLW / MLW / Other ± CRD)

Mudline Elevation: - 33.31

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 4"

Percent Recovery 66 (%)

Core/Drive Comments: 5' 8" Open / Medium Sand with some fine sand, + some coarse sand. fine to -

SEDIMENT CORE PROCESSING:

2 core sections 0-4' 4" - 7' 2"

Processors: MS Marshall ASomas

Date: 10/17/06

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--------------------|
| | 0 < > 5.3 | <u>Sand (SP) 75-100% Fine grained sand, 25% Fines, trace medium grained sand, medium gray, loose, stiff, micaceous, well sorted</u> | |
| | 5.3 < > 6.2 | <u>Sand (su) 50-75% Fine grained sand 0-25% medium to coarse grained sand, 0-25% Fines, 0-25% Fine gravel, medium grained sand. Consist of lithic and mineral fragments (Cinder basalt/Quartz feldspar, mica) sub rounded to subangular, coarse grained sand predominately lithic and subangular, gravel is lithic and subangular, micaceous, medium gray, loose, stiff, poorly sorted</u> | |
| | 6.2 < > 7.3 | <u>Sand (SP) 50-75% Fine grained sand 25-50% medium grained sand, 0-25% Fines, medium grained sand consists of same material and shape as 5.3-6.2 feet, medium gray, loose, stiff, micaceous, alternating thin beds, 10-20 cm of medium grained sand between beds (30-50 cm) of fine grained sand. Contacts are sharp, well sorted</u> | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06

Samplers: JB/SC/BJ/DD

Station Location: Moving downstream in 2nd row of DMMR from outside edge of the dredge area.

Station ID: POV-21 POV-21

Coordinates:

| | |
|-------------------|-------------------|
| Latitude/Northing | Longitude/Easting |
| 45° 39.5756 N | 122° 45.6811 W |

10:11

Measured Water Depth: -37.5' (Leadline / Sounder Other Hose Mark)

Vertical Datum: +0.50 (MLLW / MLW Other ±CRD @ 10.15)

Mudline Elevation: -37.0'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 4"

Percent Recovery 66 (%)

Core/Drive Comments: 5' 8" Open / Medium sand, some small gravel, wood fragments at surface of core / lots of water in sample - very soupy at the cuts between core sections A+B and B and the core nozzle.

SEDIMENT CORE PROCESSING:

2 core sections Processors: ASores, JSaul, MS Marshall
0-4' / 4.1-7' 11"

Date: 10/17/06

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--------------------|
| | 0 <> 4.4 | <u>Sand (SP) 75-100% fine grained sand, 0-25% fines, trace medium grained sand, consist of lithic and mineral fragments (cinder + basalt / Quartz, feldspar, mica) subrounded to subangular, medium gray, loose, stiff, micaceous</u> | |
| | 4.4 <> 4.9 | <u>Sand (SW) 50-75% fine grained sand, 25-50% medium grained sand, 0-25% fines, medium grained sand consist of lithic and mineral fragments of same material and shape as above, medium gray, loose, stiff, micaceous</u> | |
| | 4.9 <> 7.4 | <u>Sand (SP) 50-75% fine grained sand, 25-50% medium grained sand, 0-25% fines, and consists of lithic and mineral fragments same material and shape as above, alternating thin beds of medium grained sand to fine grained sand contacts are sharp, medium gray, loose, stiff, micaceous</u> | |
| | <> | | |
| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06

Samplers: JB/SC/BJ/DO

Station Location: Moving upstream along outside edge of dredge area - at project site

Station ID: POU-22

Coordinates:

| | |
|----------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45° 39.5561 N</u> | <u>122° 45.7243 W</u> |

@ 15:32

Measured Water Depth: -45.08' (Leadline / Sounder / Other _____)

Vertical Datum: +2.07' (MLLW / MLW / Other ± CRD @ 15:30)

Mudline Elevation: -43.01'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 9"

Percent Recovery 77 (%)

Core/Drive Comments: 4'3" Open / fine → med → coarse grained sand + wood chips
core note

SEDIMENT CORE PROCESSING:

Date: 10/16/06

2 core sections
~~0-4' 4.9 = 6.9~~
0-4.4' / 4.4' - 6.3'

Processors: ASOMPS, MS Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|--|--------------|--|--------------------|
| * Change log to measure sediment distribution per LWG sediment sampling guidance modified ASTM * | | | |
| 0 | < > 1.6 | Sand (SW) 75% Fine grained sand, 0-25% medium grained sand, 0-25% Fines, medium grained sand consists of lithic lithic and mineral fragment (Cinder + basalt / quartz, feldspar mica) subrounded, micaceous, medium gray loose, ST, FF, poorly sorted | |
| 1.6 | < > 3.1 | Sand (SW) 50-75% medium grained sand, 25-50% Fine grained sand, 25-50% Fines, trace coarse grained sand, medium grained sand consists of same material and shape as 0-1.6, subrounded to subangular, trace fine gravel, subangular, lithic, micaceous medium gray, loose, ST, FF ↓ grains + basalt | |
| 3.1 | < > 8.4 | Sand (SP) 77% Fine grained sand, trace medium grained sand, 50-25% 50-25% Fines medium gray, loose, ST, FF | |
| 8.4 | < > 8.7 | Sand (SW) 77% 50-75% Fine grained sand, 25-50% medium grained sand, 25-50% coarse grained sand, trace Fines, 25% wood debris, medium and coarse grained sand consist of same material and shape as above | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06

Samplers: JB/SC/BJ/DD

Station Location: Manning upstream in 1st row of DMWH (from pier headline) in dredged area proposed

Station ID: POV-23

Coordinates:

| Latitude/Northing | Longitude/Easting |
|-------------------|-------------------|
| 45° 38.5307' N | 122° 45.5719' W |

Measured Water Depth: -27.1' (Leadline / Sounder / Other _____)

Vertical Datum: +1.15' (MLLW / MLW / Other \pm CRD @ 13°15')

Mudline Elevation: -25.95'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 2"

Percent Recovery 72 (%)

Core/Drive Comments: 4' 10" Open / Med-fine to Medium sand and thin layer of fine silt (1-2mm) brown on surface of core / Med-fine to fine sand at cut between A+B core sections

SEDIMENT CORE PROCESSING:

2 core sections 0-4' / 4'-8' 10"

Processors: A. Somes, T. Squ...

Date: 10/19/06

Geologist: M. S. Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--|
| | 0 < > 5.4 | Sand (SP) 75-100% Fine grained Sand, 0-25% Fines, 0-25% trace medium grained sand, medium grained sand consist of lithic and mineral fragments (Cinder, thersalt/Quartz, feldspar, mica) subrounded medium gray, loose, stiff, micaceous, moderate to well sorted | * logging conducted according to LW & Sediment sampling guidance Modified ASTM |
| | 5.4 < > 6.3 | sand (SW) 50-75% Fine grained sand 0-25% medium grained sand, 0-25% Fines 0-25% Fine gravel, medium grained sand consist of same material and shapes as above Fine gravel consists of lithic fragments subangular, medium gray, loose, stiff micaceous, poorly sorted | |
| | 6.3 < > 8.6 | Sand (SP) 75-100% Fine grained Sand, 0-25% medium grained sand 0-25% Fines, medium grained sand consist of lithic and mineral fragments of same material and shape as above medium gray, loose, stiff, micaceous moderate to well sorted | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06

Samplers: JB/SC/BJ/DD

Station Location: moving downstream in 2nd row of DMMU from proposed pierheadline in dredge area

Station ID: POV-24

Coordinates:

| Latitude/Northing | Longitude/Easting |
|--------------------|---------------------|
| <u>15°39.5258N</u> | <u>122°45.5887W</u> |

10:01

Measured Water Depth: -29.8' (Leadline / Sounder / Other _____)

Vertical Datum: +0.89' (MLLW / MLW / Other ± CRD @) 10:00

Mudline Elevation: -28.91'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 4"

Percent Recovery 66 (%)

Core/Drive Comments: 5' 8" Open / Med sand - (note) thin layer of silt/fines - blue-brown on surface of upstream case cored 1/2' above the 8, 9, 10, 11, 12 DMMU new + in shore from outer edge of dredge area - layer is ~~1/2" to 1" in depth~~ 2mm in depth

SEDIMENT CORE PROCESSING:

Date: 10/19/06

2 core sections
0-4', 4'-7' 11"

Processors: ASomes I sawl

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 < > 5.4 | Sand (SP) 75-100% Fine grained sand 0-25% fines, wood debris @ top medium gray, loose, stiff, micaceous well sorted | Logging conducted in accordance to LWS sediment sampling guidance Modified ASTM |
| | 5.4 < > 6.4 | Sand (SW) 50-75% Fine grained sand 25-50% Fines, 0-25% medium grained sand, medium grained sand consist of lithic and mineral fragments (cinder, basalt/Quartz Felds, spar, mica) subrounded to subangular medium gray, loose, stiff, micaceous, Gravel consist of lithic subangular fragments poorly sorted | 0-25% fine gravel |
| | 6.4 < > 7.4 | Sand (SP) 50-75% Fine grained sand, 0-25% medium to coarse grained sand 0-25% Fines, medium grained sand consist of same material and shapes as above, Alternating thin beds (1-5cm) of medium grained sand in between beds (0-20cm) Fine grained sand, contacts are sharp, beds are tilted at an angle to horizontal, medium gray, loose, stiff, micaceous, well sorted | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BJ/DD
 Station Location: moving upstream in 3rd row of DMMH from outside edge of project site. Station ID: POV-25

| | | |
|--------------|--------------------|---------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 13.11 | <u>45°39.5184N</u> | <u>122°45.6063W</u> |

Measured Water Depth: -32.5 (Leadline / Sounder / Other _____)

Vertical Datum: +2.02 (MLLW / MLW / Other ± CRD) @ 1315

Mudline Elevation: -30.48

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 9' 2" Percent Recovery 72 (%)

Core/Drive Comments: 4'10" Open / Medium Sand - some fine sand + coarse sand core near the same but more coarse material, less fine sand.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 Core sections: 0-4', 4-8'10" Processors: ASomes, MS Marshall
 Geologist: MS Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-------------|--|---|
| | 0 < > 4.5 | Sand (SP) 75-100% fine grained sand 0-25% Fines, trace medium grained sand Medium grained sand consists of lithic and mineral fragments (quartz, basalt & v. quartz, Feld sp., mica) Subrounded, medium gray, loose, stiff, micaceous | * Logging conducted according to LWC Guidance for Sediment Sampling |
| | 4.5 < > 8.2 | Sand (SP) 50% - 75% fine grained sand, 25-50% medium grained sand 0-25% Fines, trace coarse grained sand, medium grained sand consists of lithic and mineral fragments same material and shape as above, coarse grained sand is lithic and subangular, medium gray, loose, stiff, micaceous, alternating thin beds (5-15 cm) of med to coarse in between beds of fine grained sand (20-30 cm) | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/06

Samplers: JB/SC/BJ/DD

Station Location: moving downstream in 2nd row of pvc site - from outside (offshore) edge

Station ID: PCV-26

Coordinates:

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.5093 W</u> | <u>122° 45.6309 W</u> |

Measured Water Depth: -38.7' (Leadline) Sounder / Other _____

Vertical Datum: +2.45 (MLLW / MLW) Other ICRD @ 14:45

Mudline Elevation: -36.25'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 3"

Percent Recovery 73 (%)

Core/Drive Comments: 4' 9" Open / Med Sand - some coarse material on core surface / material at cut between A+B section primarily fine to medium sand / same in core here plus some coarse grains

SEDIMENT CORE PROCESSING:

2 core sections
0-4.4 - 8' 10"

Processors: ASomes, JSegal, MMarshall

Date: 10/17/06

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| | 0 <> 4.5 | Sand (SP) 75-100% fine grained sand 0-25% fines trace medium grained sand medium gray, loose, stiff, micaceous, consists of lithic and mineral fragments (cinder, basalt, quartz feldspar, mica) | * logging conducted in accordance to LW & sediment sampling Guidance, Modified ASTM |
| | 4.5 <> 6.1 | Sand (sw) 50-75% fine grained sand, 0-25% medium to coarse grained sand, trace fine gravel 0-25% fines, medium fine grained sand, consist of lithic and mineral fragments, subrounded, coarse grained sand consist of lithic subrounded to subangular fragments, gravel consist of lithic subangular fragments medium gray, loose, stiff, micaceous, poorly sorted | |
| | 6.1 <> 8.2 | Sand (SP) 75-100% fine grained sand, 0-25% medium grained sand 0-25% fines, medium grained consist of lithic and mineral fragments, same shape as 0-4.5 feet, thin beds of medium grained sand @ 6.4, 6.9, 7.5, 7.7 micaceous, medium gray, loose, stiff, moderate to well sorted. | ← Alternating thin beds of fine to medium grained sand |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06

Samplers: JTB/sc/B.J/DD

Station Location: Moving towards center of project side along outside DMN in the dredge area

Station ID: POV-27

Coordinates:

| | |
|----------------------|-----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45° 39.4931 N</u> | <u>122° 45.6739 W</u> |

@ 16:09

Measured Water Depth: -44.6' ((Leadline) Sounder / Other _____)

Vertical Datum: + 1.92' (MLLW / MLW (Other ± CRD)) @ 16:15

Mudline Elevation: -42.68'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 8"

Percent Recovery 68 (%)

Core/Drive Comments: 5'4" Open / med-coarse sand / some gravel in core nose

SEDIMENT CORE PROCESSING:

Date: 10/10/06

2 core sections
0-4'3" / 4'3"-8'4"

Processors: A.Somes, MS Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-------------------------------|--------------|--|--------------------|
| <i>* changed logs to this</i> | | | |
| | 0 <> 5.1 | Quartzite size distribution per LWG sediment sampling guidance Sand (SW) 75% Fine grained sand 0-25% medium grained sand, medium grained sand consist of lithic and mineral fragments (cinder + basalt / quartz, feldspar, mica) subrounded micaceous 0-25% fines, medium gray loose stiff, poorly sorted | |
| | 5.1 <> 5.7 | Sand (SW) 50-75% Fine grained sand, 20-50% medium grained sand, consists of same shape and material as 0-5.1 feet 0-25% coarse grained sand, consist of lithic fragments, subrounded to subangular, trace fine gravel, lithic, subrounded to subangular medium gray, loose, stiff | |
| | 5.7 <> 8.0 | Sand (SW) 50-75% Fine grained sand, 50-75% medium grained sand, medium grained sand consists of same material and shape as 5.1-5.7 feet, medium gray, loose, stiff alternating thin beds of fine to coarse grained sand | |

SEDIMENT CORE SAMPLING:

Date: 10/17/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving upstream in 1st row of DMMU in dredge area 1st row from proposed pierhead line. Station ID: POV-28
 Coordinates:

| | |
|------------------------|-------------------|
| Latitude/Northing | Longitude/Easting |
| 13:51 45° 39.465' N | 122° 45.522' W |

 Measured Water Depth: -28.5' (Leadline / Sounder / Other _____)
 Vertical Datum: +1.61' (MLLW / MLW / Other ICRD @) 13:45
 Mudline Elevation: -26.42'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 8' 1" Percent Recovery 64 (%)
 Core/Drive Comments: 5' 11" Open / Medium Sand & thin layer of brown silt (F2mm) on surface of core / Med line to medium sand - at cut between core section A+B) same material in core base.

SEDIMENT CORE PROCESSING:

Date: 10/19/06 feet 2 core sections Processors: A. Somers, J. Saul
0-4' / 4'-7' 8" Geologist: MS Marshall

| Core Section(s) | Depth (<n>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|-------------|---|---|
| | 0 <> 5.5 | Sand (SP) 75-100% Fine grained sand 0-25% Fines, trace medium grained sand medium gray, loose, stiff, micaceous, <> medium gray sand is lithic and mineral <> fragments (cinder + basalt / quartz, feldspar, mica) <> subrounded, well sorted | * logs inconducive in accordance to USGS sediment Sampling guidance modified ASTM |
| | 5.5 <> 7.4 | Sand (SP) 50-75% Fine grained sand 0-25% 0-25% medium grained sand, 0-25% Fines, medium grained sand <> consist of lithic and mineral fragments <> of same material and shape as above, medium <> gray, loose, stiff, micaceous, medium grained <> sand in thin beds (3-10 cm) in between <> beds (3-20 cm) of fine grained sand, <> alternating beds, at an angle from horizontal | |
| | <> | | |
| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06

Samplers: JB/SC/RJ/DD

Station Location: moving down stream in 2nd row (from proposed pierhead line) of DMML in dredge area

Station ID: POV-29

Coordinates:

| Latitude/Northing | Longitude/Easting |
|------------------------------------|-------------------|
| 09:00 1st 45°39.4574 N 1st | 122°45.5376 W 1st |
| 09:20 2nd 45°41' N 2nd 1st attempt | 53576 2nd |

Attempt #1

Measured Water Depth: 27.9 ~~27.5~~ (Leadline) Sounder (Other) hose mark ~~end attempt.~~ 30.5

Vertical Datum: +1.15 (MLLW/MLW/Other) I CRD @ -07:15

Mudline Elevation: -29.35'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 6"

Percent Recovery 67 (%)

Core/Drive Comments: Attempt #1 - 7'6" Open - leaves only 6'6" in core tube / Attempt #2 - moving slightly away from 1st attempt location - 5'6" Open / Medium Sand with fine sand not as much coarse sand in this sample - same material in core nose

SEDIMENT CORE PROCESSING:

2 core sections
0-4', 4'-8' 7"

Processors: Somes Isaul

Date: 10/19/06

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--|
| | 0 <> 0.5 | Sand (SP) 75-100% fine grained sand, 0-25% Fines, medium gray, loose, stiff micaceous, well sorted | Logging conducted in accordance to LWB soil ment sampling guidance Modified ASTM |
| | 0.5 <> 0.9 | Silt (ML) 75-100% fines, moderate to low plasticity, rapid dilatancy, medium gray | |
| | 0.9 <> 6.1 | Sand (SP) 75-100% fine grained sand 0-25% fines, trace medium grained sand consist of lithic and mineral fragments (Cinder + basalt / Quartz, feldspar, mica) sub rounded to sub angular, medium gray loose, stiff, micaceous, well to moderate sorting | |
| | <> | Sand (SP) 50-75% fine grained sand 0-25% medium to coarse grained sand | |
| | <> | 0-25% fines, medium grained sand consists of lithic and mineral fragments of same material and shape as above | |
| | <> | coarse grained sand consist of lithic sub angular fragments Alternating thin beds (2-5cm) of medium grained sand in between beds (10-15cm) of fine grained sand, contacts are sharp to slightly gradational, beds at slight slight angle, medium gray, loose, stiff, micaceous, well sorted | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06

Samplers: JB/SC/BJ/DD

Station Location: maining, upstream in 3rd row of DMN
10m outside edge of dredge area

Station ID: POV-30

Coordinates:

| Latitude/Northing | Longitude/Easting |
|---------------------|----------------------|
| <u>45°39'45.13N</u> | <u>122°45'55.22W</u> |

Measured Water Depth: -35.7' (Leadline/ Sounder / Other _____)

Vertical Datum: +2.49 (MLLW / MLW / Other _____) ±CRD @ 1345

Mudline Elevation: -33.21

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 5"

Percent Recovery 74 (%)

Core/Drive Comments: 4' 7" Open / med sand with some fine sand at core surface /
medium sand - some fine + coarse sand also, some, small, worn angular
gravel

SEDIMENT CORE PROCESSING:

Date: 10/18/06

2 core sections
0-4', 4'-9'

Processors: ASOMES, MS Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| | 0 < > 6.2 | Sand (SP) 75-100% fine grained sand, 0-25% Fines, medium gray, loose, stiff micaceous, well sorted | * logging conducted in accordance with LWG guidance sediment sampling modified ASTM |
| | 6.2 < > 8.1 | Sand (SP) 50-75% fine grained sand, 25-50% medium grained sand, 0-25% Fines | |
| | < > | 0-25% coarse grained sand, medium grained sand consist of lithic and mineral fragments (cinder + basalt / Quartz, feld spar, mica) sub rounded to subangular, coarse grained sand consist of lithic subangular to sub rounded fragments | |
| | < > | medium gray, loose, stiff, micaceous | |
| | < > | alternating thin beds (3-10cm) in between beds of (5-20cm) of fine grained sand | |
| | < > | well sorted, contacts are sharp and appear to be angled from horizontal | |
| | < > | | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/06 Samplers: JB/SC/BJ/DD
 Station Location: margin, downstream in 2nd row of DMMU from outside edge of project area Station ID: POV-31

Coordinates: 14:05

| Latitude/Northing | Longitude/Easting |
|-------------------|-------------------|
| 45° 39.4408 N | 122° 45.5769 W |

Measured Water Depth: -38.7' (Leadline / Sounder / Other _____)

Vertical Datum: +2.65' (MLLW / MLW / Other CAD CRD) @ 14:00
213/145 10/13/06

Mudline Elevation: -36.05'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 9' 5.5" Percent Recovery 75 (%)

Core/Drive Comments: 4' 6" Open/coarser material at top of core but fine -> med. fine sand w/ cut between sections A+B / mixed in core mass.

SEDIMENT CORE PROCESSING:

Date: 10/17/06 Processors: A. Somes, MS Marshall, F. Saul
 Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| | 0 <> 6.3 | Sand (SW) 50-75% fine grained sand, 0-25% fine medium grained sand, 0-25% fines. Trace coarse grained sand, micaceous, medium gray, loose, stiff, medium grained sand consists of lithic and mineral subrounded fragments (cinder, basalt/quartz, feldspar, mica), coarse grained sand is lithic and sub rounded to sub angular poorly sorted. | *logging concluded according to LWS guidance Sediment sampling Mod. Prod ASTM |
| | 6.3 <> 8.1 | Sand (SP) 75-90% fine grained sand, 0-25% fines, medium gray, loose, stiff micaceous, well sorted. | |
| | 8.1 <> 8.6 | Sand (SP) 50-75% fine grained sand, 25-50% medium grained sand, 0-25% fines, micaceous, medium gray, loose, stiff, medium grained sand consists of lithic and mineral fragments same material and shape as 0-6.3 feet, alternating thin beds of (10-20cm) of fine to medium grained sand, well sorted. | |
| | <> | | |
| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/12/06

Samplers: JP/SC/BJ/DD

Station Location: Moving along outside DPMU on bridge area towards center of project site

Station ID: POV-32

Coordinates:

| | |
|-------------------|-------------------|
| Latitude/Northing | Longitude/Easting |
| 45° 39.4266 N | 122° 45.6072 W |

© 1646

Measured Water Depth: -43.1' (Leadline) Sounder / Other _____

Vertical Datum: +1.83' (MLLW / MLW) Other ±CRD (B) 16:45

Mudline Elevation: -41.27'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 9"

Percent Recovery 69% (%)

Core/Drive Comments: 5' 3" Open / materials same as observed in earlier samples

SEDIMENT CORE PROCESSING:

Date: 10/16/06

2 core sections
0-4' / 4'-8' 5"

Processors: Somes MS/Marshall

Geologist: MS/Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|--|--------------|--|--------------------|
| * Changed logs to more of a quartile sized distribution per LWG Sediment Sampling guidance * | | | |
| 0 | <> 5.4 | Sand (SW) 75% Fine grained sand, 0-25% medium grained sand, medium grained sand consists of mineral and lithic fragment (Quartz + Feldspar + mica) / cinder + basalt) appear sub rounded, micaceous 0-25% Fines, medium gray, loose, stiff poorly sorted | |
| 5.4 | <> 5.9 | Sand (SW) 50-75% Fine grained sand, 25-50% medium grained sand, 0-25% coarse grained sand, medium grained sand consist of lithic and mineral fragments (cinder + basalt / Quartz Feldspar + mica), sub rounded, coarse grained sand consists of lithic fragments, fine grained sub rounded sub angular lithic, medium gray loose stiff | |
| 5.9 | <> 7.7 | Sand (SW) 50% Fine grained sand, 50-75% medium grained sand, medium grained sand consist of same material and shape as above, medium gray, loose, stiff, alternating thin beds of fine to coarse material | |

SEDIMENT CORE SAMPLING:

Date: 10/17/06

Samplers: JB/SC/BJ/DD

Station Location: mainly upstream in 1st row of DMARK in dredge area (1st row offshore proposal pier headline). Station ID: POV-33

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| H:16 | 45° 39.4033 | 122° 45.4588 W |

Measured Water Depth: -28.7' (Leadline / Sounder / Other _____)

Vertical Datum: +2.08' (MLLW / MLW / Other ICRD @ 14:15)

Mudline Elevation: -26.62'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 6"

Percent Recovery 75 (%)

Core/Drive Comments: 4' 6" Open / ? Maybe a void in the core - had lots of water pouring out of the nose before it could be capped. / med-fine to fine medium sand with 1-2 mm layer of silt on surface of core (brown silt). Core nose - medium sand med-fine to medium sand - some coarser material

SEDIMENT CORE PROCESSING:

Date: 10/19/06

2 core sections, 0-4' 4" - 9' 1"

Processors: ASomes, Isaac

Geologist: Ms Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 < > 2.3 | Sand (SP) 75-100% Fine grained sand, 0-25% Fines, wood fragment @ 1.6, trace medium grained sand, consist of lithic and mineral fragments (cinder/basalt/quartz, feldspar, mica) subrounded to subangular, medium gray, loose, stiff, micaceous, moderate to well sorted. | <p>WGS 4.1</p> <p>Sampling guidance Mod. Field ASTM</p> |
| | < > | | |
| | 2.3 < > 2.6 | Sand (SW) 50-75% fine grained sand 25-50% Fines, 25-50% wood fragments silt nodule (a little ball of silt or clay?) moderate plasticity, medium gray, loose, stiff micaceous, poorly sorted | |
| | < > | | |
| | 2.6 < > 8.6 | Sand (SP) 75-100% fine grained sand 0-25% medium grained sand, 0-25% fines medium grained sand consist of lithic and mineral fragments of same material and shape as above (0-2.3), medium gray, loose, stiff, micaceous, lense of medium grained sand @ 8-8.3 feet, well sorted | |
| | < > | | |
| | < > | Medium fine grained sand 8-8.3 | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BT/DD
 Station Location: moving, down stream in 2nd Row from proposed pier head line) of DMMU in dredge area Station ID: POV-34

| | | |
|-------------------|----------------------|-----------------------|
| Coordinates: 1540 | Latitude/Northing | Longitude/Easting |
| | <u>45° 39.3964 N</u> | <u>122° 45.4710 W</u> |

Measured Water Depth: -31.1' (Leadline / Sounder / Other _____)
 Vertical Datum: +3.53 (MLLW / MLW / Other ± CRD) @ 1545
 Mudline Elevation: -27.57
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 9' 1" Percent Recovery 72 (%)

Core/Drive Comments: 4' 11" Open / Med sand - as before / at cut between core sections A & B - several large pieces of gravel, sub-angular and worn appearance.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 Processors: ASomes I Sac I
 Geologist: MS Marshall
 2 core sections
 0-4', 4'-8' 8"

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--|
| | 0 <> 1.8 | Sand (SP) 75-100% fine grained sand 0-25% fines, trace medium grained sand medium grained sand consist of lithic and mineral fragments (cinder, basalt/Quartz, Feldspar mica), medium gray, loose, stiff, micaceous moderate to well sorted | * conducted in accordance to LWG Guidance for sediment sampling, Modified ASTM |
| | 1.8 <> 4.3 | Sand (SW) 25-50% fine grained sand 25-50% medium grained sand, 0-25% coarse grained sand, 0-25% fines, trace fine gravel, medium grained sand consists of lithic and mineral fragments as above, coarse grained sand consist of lithic subangular fragments and aphanitic aphanitic (basalt?) sub rounded to subangular fragments, medium gray, dense, stiff, micaceous, poorly sorted | |
| | 4.3 <> 8.2 | Sand (SP) 50-75% fine grained sand 25-50% fines, 0-25% medium grained sand, upward fining gradational contact medium grained sand (near bottom) consist of same material and shape as above medium gray, loose, stiff, micaceous well to moderate sorting | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06

Samplers: JB/SC/BT/DD

Station Location: Moving upstream in 3rd Row of DMWH from outer edge of dredge area

Station ID: POV-35 POV-35

Coordinates:

| | |
|-------------------|-------------------|
| Latitude/Northing | Longitude/Easting |
| 45° 39.3872 N | 122° 45.4904 W |

14:15

Measured Water Depth: -34.4' (Leadline / Sounder / Other _____)

Vertical Datum: + 2.86 (MLLW / MLW / Other ICRD @ 1415)

Mudline Elevation: -31.54'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 8' 4"

Percent Recovery 66 (%)

Core/Drive Comments: 5' 8" Open / Med-Fine to Medium sand and wood chips on surface of core / medium sand with some fine to coarse sands and small gravel at cut between core sections A+B / some materials in core not

SEDIMENT CORE PROCESSING:

Date: 10/17/06

2 core sections
0-4' 14" - 7' 11"

Processors: MS Marshall, A Sames

Geologist: MS Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|------------|---|---|
| 0 <> 2 | | Sand (SP) 75-100% fine grained sand 0-25% medium grained sand 0-25% fines consists of lithic and mineral fragments (Cinder + basalt / quartz, feldspar, mica) subrounded to subangular, medium gray, loose, stiff, micaceous moderate to well sorted | * logging conducted in accordance to LWG Sediment Sampling Guidance Modified ASTM |
| 2 <> 5.4 | | Sand (SW) 50-75% fine grained sand, 0-25% medium to coarse grained sand, 0-25% fine gravel 0-25% fines, medium grained sand consist of lithic and mineral fragments of same material and shape as above coarse grained sand and gravel are lithic and subangular, medium gray, loose, stiff micaceous, poorly sorted | |
| 5.4 <> 7.3 | | Sand (SP) 75-100% fine grained sand, 0-25% medium grained sand, 0-25% fines, medium grained sand, consist of lithic and mineral fragments of same material and shape as above, medium gray, loose, stiff, micaceous, moderate to well sorted, | |

SEDIMENT CORE SAMPLING:

Date: 10/13/06 Samplers: JB/SC/BJ/DD
 Station Location: moving down stream along 2nd row of DMMU from outside edge of project area Station ID: PCV-36

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 13:20 | 45° 39' 37.8" N | 122° 45' 51.7" W |

Measured Water Depth: -37.7' (Leadline) Sounder / Other _____

Vertical Datum: +2.82' (MLLW / MLW) (Other) CRD @ 13:15

Mudline Elevation: -34.88'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: * 9' 8" Percent Recovery 76 (%)

Core/Drive Comments: 4' 4" Open / Wood fragments on core surface / Medium to coarse sand, small gravel in core nose.

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Processors: A. Somas MS Marshall I. Saul
 3 core sections 0-4, 4-8, 8-9.5"
 Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--|
| | 0 < > 5.8 | Sand (SP) 75-100% fine grained sand, 0-25% Fines, trace medium grained sand, wood debris first inch (wood chips, bark, rotten branches) medium gray, loose, stiff, micaceous, well to moderate sorting | * logging conducted in accordance to LWG Sediment sampling guidance, modified ASTM |
| | 5.8 < > 6.4 | Sand (SW) 50-75% fine grained sand, 0-25% medium grained sand, trace coarse grained sand | |
| | 6.4 < > 7.2 | 0-25% Fine gravel, 0-25% Fines, medium grained sand consists of little and minimal fragments, siltstone (quartz, Feldspar, mica) sub-rounded coarse grained sand is composed of lithic subangular fragments (granite), bed of mostly | |
| | 7.2 < > 8.6 | Sand (SP) 50-75% fine grained sand, 0-25% medium grained sand, 0-25% Fines medium grained sand consists of same material and shape as above, alternating thin beds (10-20cm) of fine to medium grained sand, trace coarse grained sand in with medium grained sand thin beds, micaceous, medium gray, loose, stiff well sorted, sharp contacts between beds | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/00

Samplers: JB/SC/BJ/DD

Station Location: POV ~~37~~ outside edge of project
moving upstream

Station ID: POV-37

Coordinates:

| Latitude/Northing | Longitude/Easting |
|---------------------|----------------------|
| <u>45° 39.3613N</u> | <u>122° 45.5406W</u> |

09:26

Measured Water Depth: - 41' 11" (Leadline / Sounder / Other _____)

Vertical Datum: + 1.75' (MLLW / MLW (Other) (RD (+/-)) @ 0930)

Mudline Elevation: -39.36'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 10' 5"

Percent Recovery 82% (%)

Core/Drive Comments: 3' 7" Open / 1st cut A to B - medium sand-small gravel / Top of core - small wood chips. NOT as much water in core material

SEDIMENT CORE PROCESSING:

3 core sections
0-4, 4-8, 8-10

Processors: ASomes MS Marshall

Date: 10/16/00

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--|
| | 0 <> 3.1 | Sand (SP) 75% Fine grained sand 50-25% Fines, medium gray, loose, stiff Micaceous, well sorted | Logging Dept is sediment sampling guidance Modified ASomes |
| | 3.1 <> 9.2 | Sand (SW) 50-75% Fine grained sand, 25% medium grained sand, 25% fines Trace fine gravel, medium grained sand consists of lithic and mineral fragments (andesite + basalt) / Quartz, feldspar, mica subrounded Fine gravel is lithic and subrounded to subangular trace wood debris, medium gray, loose, stiff poorly sorted | |
| | 9.2 <> 10 | Sand (SW) 50-75% Fine grained sand, 25% medium grained sand, 25% fines medium grained sand consist of same material and shape as above + trace coarse grained sand, subrounded to subangular micaceous, medium gray, loose, stiff | |

SEDIMENT CORE SAMPLING:

Date: 10/17/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving upstream in 1st row of PMMU in ~~tree~~ dredge area (1st row from proposed pier headline). Station ID: POV-38 (PBV-38)

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 14:44 | 45°39.3440 N | 122°45.3921 W |

Measured Water Depth: -29.7' (Leadline / Sounder / Other _____)
 Vertical Datum: +2.52' (MLLW / MLW / Other ± CRD C 14.45)
 Mudline Elevation: -27.18'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 9' 8" Percent Recovery 68 (%)

Core/Drive Comments: 4' 4" Open / Medium sand at surface of core, also med-fine to 1-2mm brown silt on surface / med-fine to medium sand at cut between core sections A+B / Same material at cut between B+C core sections. Med-fine to medium sand in core nose

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Processors: ASomer, Isaac
3 core sections 0-4' / ~~4-8' / 8-9' 3"~~ 4-8' / 8-9' 3" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--|
| | 0 < > 5.4 | <u>Sand (SP) 75-100% Fine grained sand 0-25% Fines, trace medium grained sand consists of lithic and mineral fragments (circular, bristly/Quartz Feldspar mica) subrounded to subangular, medium gray, loose, stiff, micaceous, well to moderate sorting</u> | <u>Logging concluded in accordance to LUG sediment Sampling Guidance modified ASTM</u> |
| | 5.4 < > 7.9 | <u>Sand (SP) 50-75% fine grained sand 25-50% Fines, 0-25% medium grained sand, trace coarse grained sand consists of lithic and mineral fragments of same material and shape as above coarse grained sand and fine gravel consist of lithic sub rounded to subangular fragments alternating beds of medium/coarse, gravel (5-10cm) in between beds (10-40cm) of fine grained sand, beds are at an angle to the horizontal, medium gray, loose, stiff micaceous, moderate to well sorted</u> | |
| | 7.9 < > 9.1 | <u>Sand (SP) 75-100% Fine grained sand 0-25% Fines, medium gray, loose, stiff micaceous, well sorted, consists of mineral and lithic fragments,</u> | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BJ/DD
 Station Location: moving to 4th row of DMML from outside edge (off shore edge) of dredge area - This 2nd row of DMML from proposed pile headline. Station ID: POV-39

Coordinates: 15:10

| Latitude/Northing | Longitude/Easting |
|---------------------|----------------------|
| <u>45°39.3381 N</u> | <u>122°45.4034 W</u> |

Measured Water Depth: -31.8 (Leadline) Sounder / Other _____

Vertical Datum: +3.45 (MLLW/MLW/Other ±CRD) @ 1515

Mudline Elevation: -28.35

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 7' 8" Percent Recovery 61 (%)

Core/Drive Comments: Different material or composition about 9-11 ft / 6' 4" down / Medium sand / some coarse sand + fine sand also. Again lots of cracks in core material sand in core nose - med - fine to medium.

SEDIMENT CORE PROCESSING:

Date: 10/18/06 Processors: Samas, Isaac
2 core sections 0-4', 4-7' 3" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | | <u>See note about core drive above - 9/16/06</u> | |
| | 0 <> 5 | <u>Sand (SP) 75-100% fine grained sand</u> | <u>* conducted in accordance to LWS Sediment Sampling guidance mod. Dred ASTM</u> |
| | <> | <u>0-25% fines, trace medium grained sand, medium grained sand consists of lithic and mineral fragments (Cinder, basalt, quartz, feldspar mica) sub rounded, medium gray, loose stiff micaceous, moderate to well sorted</u> | |
| | 5 <> 6.5 | <u>Sand (SW) 50-75% fine grained sand</u> | |
| | <> | <u>25-0% medium grained sand, 0-25% fines, medium grained sand consists of lithic and mineral fragments as above</u> | |
| | <> | <u>medium gray, loose, stiff, micaceous poorly sorted</u> | |
| | <> | | |
| | <> | | |
| | <> | | |

SEDIMENT CORE SAMPLING:

Date: 10/16/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving upstream in 3rd row of DMMU from off-shore (outside) edge of dredge area Station ID: POV-90

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 14:42 | 45° 39.3314 N | 122° 45.4163 W |

Measured Water Depth: -34.3' (Leadline / Sounder / Other _____)

Vertical Datum: +3.21 (MLLW / MLW / Other ± CRD@14:45)

Mudline Elevation: -31.09'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 9' 1" Percent Recovery 72 (%)

Core/Drive Comments: 4' 11" open / cage & core tube may have been leaning over at an angle / Med. sand with some fine sand, some coarse sand and some small gravel at surface of core / some materials at cut between core sections A & B and in A are here.

SEDIMENT CORE PROCESSING:

Date: 10/17/06 Processors: ASomes MS Marshall
2 core sections 0-4' / 4'-8' 7" Geologist: MS Wiers Hall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--|
| | 0 < > 2.5 | <u>Sand (SP) 75-100% fine grained sand 0-25% fines, medium gray, loose, stiff micaceous, 4mm @ 1 foot with wood debris well sorted</u> | * Logging conducted in accordance with LWS Sediment sampling guidance, modified ASTM |
| | 2.5 < > 2.7 | <u>sand (su) 50-75% medium grained sand 25-50% fine grained sand 0-25% fines, medium grained sand consist of lithic and mineral fragments (cinder/basalt/Quartz, Feldspar mica) subrounded to subangular, medium gray micaceous, loose, stiff, poorly sorted</u> | |
| | 2.7 < > 4.1 | <u>Sand (sp) same as 0-2.5</u> | |
| | 4.1 < > 4.7 | <u>sand (su) same as 2.5-2.7</u> | |
| | 4.7 < > 7.3 | <u>Sand (SP) 50-75% fine grained sand, 0-25% medium grained sand, 0-25% fines, trace fine gravel, trace coarse grained sand medium grained sand consist of lithic and mineral fragments of same material and shape as 2.5-2.7</u> | |
| | | <u>Fine gravel and coarse grained sand consist of lithic subangular fragments, medium gray, loose</u> | |

Stiff, micaceous, moderate sorting

SEDIMENT CORE SAMPLING:

Date: 10/13/06 Samplers: EJB/SC/B.T/DD
 Station Location: Mowing dam stream - 2nd row of dam from outside edge of dredge area Station ID: POV-41

Coordinates:

| | |
|-------------------------------------|----------------------|
| Latitude/Northing | Longitude/Easting |
| <u>11:57</u> <u>45° 39.3206N</u> | <u>122° 45.4357W</u> |

Measured Water Depth: -37.3' (Leadline / Sounder / Other _____)

Vertical Datum: +2.96' (MLLW / MLW / Other CRD @ 12:00)

Mudline Elevation: -34.34'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 10' 1" Percent Recovery 80 (%)

Core/Drive Comments: 3' 11" Open / Wood chips + gravel on surface of core / Material appears coarser than POV-37, POV-42, POV-48

SEDIMENT CORE PROCESSING:

Date: 10/17/06 Processors: ASomes, MSMarshall, ISS
3 core sections 0-4, 4-8, 8-9 1/8" Geologist: MSMarshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--|
| | 0 < > 0.2 | Wood debris large pieces (1-2 in) of bark and branches (broken) and , some fine grained sand mixed in but likely from lower sediment horizon | * Logging conducted in accordance to LWG sediment sampling guidance. Modified ASTM |
| | 0.2 < > 7.1 | Sand (SP) 75-100% Fine grained sand, 0-25% medium grained sand, 0-25% Fines medium grained sand consists of lithic and mineral fragments (cinder, chert/Quartz, feldspar, mica) subangular micaaceous, medium gray, loose, stiff, well sorted | |
| | 7.1 < > 8.3 | Sand (SW) 50-75% Fine grained sand, 0-25% medium grained sand, 0-25% Fine gravel, 0-25% Fines medium grained sand consists of same material and shape as 0.2-7.1 feet, gravel consists of lithic (granitic) fine subangular fragments, medium gray, loose, stiff, poorly sorted | |
| | 8.3 < > 9.1 | Sand (SW) 50-75% Fine grained sand, 25-50% Fines, 25-50% medium grained sand medium grained sand consists of same size material and shape as above, medium gray, loose STIFF alternating thin beds of fine to coarse grained sand about 10-20 cm thick | |

= 7.3

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/06 Samplers: JB/SC/BJ/DD
 Station Location: outside edge of project site - moving upstream Station ID: POV-42

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 10:06 | 45°39.3025N | 122°45.4714W |

Measured Water Depth: 41.8' (Leadline) Sounder / Other _____
 Vertical Datum: +2.02' (MLLW / MLW / Other) CRD @ 10:00
 Mudline Elevation: -39.78'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 10' Percent Recovery 79 (%)

Core/Drive Comments: 4' open / med fine sand / not as much water in case material / fine grained sand in core nose

SEDIMENT CORE PROCESSING:

Date: 10/16/06 Processors: AS omes / MS Marshall
3 core sections 0-4.4-8, 8-9.7 Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|---|--------------|--|--------------------|
| * Logging conducted in accordance to LUG guidance for sediment sampling modified ASTM-8 | | | |
| | 0 - <> 4.4 | Sand (sw) 77.5% fine grained sand, 0-25% medium grained sand, 2.5% fines, medium grained sand consists of lithic and mineral fragments, (clerite, biotite / quartz, feldspar mica) subrounded, micaceous, medium gray loose, stiff, moderate sorting | |
| | 4.4 - <> 6.2 | Sand (sw) 50-75% medium grained sand, 50-75% coarse grained sand, trace fine gravel, trace fines, medium grained sand consists of same material and shape as above coarse grained sand is composed of lithic subangular fragments; medium gray, loose, stiff micaceous | |
| | 6.2 - <> 8.9 | Sand (sw) 75-100% fine grained sand, 0-25% fines, 0-25% medium grained sand, medium grained sand consists of same material and shape as above, medium gray loose, stiff, micaceous, trace wood debris | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06 upstream Last station in 1st row of DMMU (from proposed pier headline) in dredge area Station Location: POV-43 Station ID: POV-43 Samplers: JB/SC/BJ/DD

| | | |
|--------------|--------------------|---------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 15:20 | <u>45°39.2919N</u> | <u>122°45.3378W</u> |

Measured Water Depth: 31.6' (Leadline / Sounder / Other _____)

Vertical Datum: +2.83' (MLLW / MLWT / Other ±CRD @ 15:15)

Mudline Elevation: -28.77'

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 10' 1" Percent Recovery 80 (%)

Core/Drive Comments: 3' 11" Open / Med. - fine to medium sand with 1-2mm layer of brown silt at surface of core / med. - fine to medium sand at cuts between core sections A+B and B+C / med. med. - fine to medium sand in core base

SEDIMENT CORE PROCESSING:

Date: 10/19/06 3 core sections Processors: James, Isaac 0-4' / 4-8' / 8-9' 8" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| 0 | < > 5.3 | Sand (SP) 75-100% fine grained sand 0-25% Fines, medium gray, loose stiff micaceous, well sorted | * logging conducted in accordance to LWB sediment sampling guidance Modified ASTM |
| 5.3 | < > 6.4 | Sand (Su) 50-75% fine grained sand 0-25% Fines, 0-25% medium to coarse grained sand, 0-25% fine gravel, medium grained sand consists of lithic and mineral fragments (cinder and basalt / quartz feldspar, mica) subangular and subangular, coarse grained sand and gravel consist of lithic subangular fragments medium gray, loose stiff, micaceous, poorly sorted | |
| 6.4 | < > 7.4 | Sand (SP) 75-100% fine grained sand 0-25% Fines, medium gray, loose, stiff micaceous, well sorted | |
| 7.4 | < > 8.9 | Sand (SP) 50-75% fine grained sand, 0-25% medium grained sand, 0-25% Fines medium grained sand consists of lithic and mineral fragments of same material and shape as 5.6-6.4 feet alternating thin beds (3-10cm) of medium grained sand in between beds (2-25cm) of fine grained sand, contacts are sharp, beds are at an angle | |

to the horizontal, medium gray, loose stiff, micaceous, well sorted

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/17/06
 Station Location: Moving out (to off-shore) in ninth (last) ^{upstream} row of DMMU before 5 large single DMMU in dredge area Samplers: JB/SC/BJ/DD
 Station ID: POV-44

| | | |
|--------------|-------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 15:54 | 45 39.2858 N | 122 45.3495 W |

Measured Water Depth: -33.2' (Leadline / Sounder / Other _____)

Vertical Datum: +3.21' (MLLW / MLW / Other ±CRD @ 16:00)

Mudline Elevation: -29.99

Estimated Penetration: 12'8" Refusal: None

Total Core Length: 8'11" Percent Recovery 70 (%)

Core/Drive Comments: 5'11" Open / ^{med.} fine to medium sand with 1-2 mm layer of brown silt at surface of core / med. fine to medium sand at cut between core sections A+B / med. fine to medium sand in core nose / noted some coarse material in all sections described.

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Processors: AScorcos Isaac
2 core sections 0-4' / 4'-7'8" Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 < > 0.6 | Sand (SP) 75-100% Fine grained sand 0-25% fines, medium gray, loose, stiff micaceous, moderate to well sorted | <input checked="" type="checkbox"/> Logging Conducted in accordance to LUG Sediment Sampling guidance Modified ASTM |
| | 0.6 < > 1.1 | Silt (ML) 75-100% Fines, moderate to low plasticity, medium gray, rapid dilatancy, low toughness, | |
| | 1.1 < > 4.6 | Sand (SP) 75-100% Fine grained sand 0-25% fines, trace medium grained sand, medium grained sand consists of lithic and mineral fragments (cinder, basalt/Quartz Feldspr, mica) subrounded to sub angular medium gray, loose, stiff, micaceous moderate to well sorted | |
| | 4.6 < > 5.1 | Sand (SP) 50-75% Fine grained sand 50-75% medium grained sand, 0-25% fines, medium grained sand consists of lithic and mineral fragments of same material and shape as above medium gray, loose, stiff, micaceous, poorly sorted | |
| | 5.1 < > 7.8 | Sand (SP) 75-100% Fine grained sand, 0-25% fines, 0-25% medium grained sand, medium grained sand consists of same material and shape as above, medium gray, loose, stiff, micaceous moderate to well sorted, | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/18/06

Samplers: JB/SC/BJ/DD

Station Location: Moving offshore from proposed pier headline in the 9th (last) column of DMU towards the outside edge of the dredge area

Station ID: POV-45

Coordinates:

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.2806 N</u> | <u>122° 45.3597 W</u> |

Attempt #1 - 34.5'

Measured Water Depth: -31.5' (Leadline / Sounder / Other _____)

Vertical Datum: +0.65' (MLLW / MLW / Other ICRD @ 0915)

Mudline Elevation: -30.85'

Estimated Penetration: 12.18"

Refusal: At -44' / None (Attempt #1 / Attempt #2)

Total Core Length: 4' 9" 1"

Percent Recovery 72 (%)

Core/Drive Comments: 4' 11" open / Med. sand - fine sand + silt (1-2 mm) with abundant wood chips on surface of core / med. sand at rest between core sections A+B / same sand in core nose with wood fragments

SEDIMENT CORE PROCESSING:

Date: 10/19/06

2 core sections
0-4' / 4'-8' 8"

Processors: ASomas I Saul

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 < > 2.6 | Sand (SP) 75-100% Fine grained Sand, 0-25% Fines, 0-25% medium grained sand, medium grained sand consists of lithic and mineral fragments (cinder + basalt Quartz, feldspar, mica) subrounded to subangular medium gray, loose, stiff, micaceous, well sorted | * logging conducted in accordance to LWB sediment sampling guidance modified ASTM |
| | 2.6 < > 3.5 | Sand (SW) 50-75% Fine grained sand, 0-25% medium to coarse grained sand, trace fine gravel, 0-25% wood debris, medium grained sand consists of lithic and mineral fragments of same material and shape as above, medium gray, loose, stiff, micaceous, coarse grained sand and gravel consists of lithic subangular fragments, poorly sorted | |
| | 3.5 < > 6.7 | Sand (SP) 75-100% Fine grained sand, 0-25% Fines, 0-25% medium grained sand, medium grained sand consists of same material and shape as above, trace coarse grained sand consists of lithic subrounded to subangular fragments medium gray, loose, stiff, micaceous, moderate to well sorted | |
| | 6.7 < > 8.3 | Sand (SP) 50-75% Fine grained sand, 0-25% medium grained sand, 0-25% Fines, trace fine gravel, medium grained sand consists of same material and shape as above | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/18/06

Samplers: PS JB/SC/BJ/DD

Station Location: Moving offshore from proposed pierheadline in 9th (last) column of DWH towards the edge of the dredge area

Station ID: POV-46

Coordinates:

09:43

| Latitude/Northing | Longitude/Easting |
|-------------------|-------------------|
| 45°39.2713N | 122°45.3788W |

Measured Water Depth: -35.2' (Leadline / Sounder / Other _____)

Vertical Datum: +0.48' (MLLW / MLW / Other ±CRD @ 09:45)

Mudline Elevation: -34.72'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 9' 8"

Percent Recovery 76 (%)

Core/Drive Comments: 4' 4" Open / Med. sand with 1-2mm layer brown silt on surface of core / med. sand at cut between core sections A+B / not as much water in this core as before

SEDIMENT CORE PROCESSING:

Date: 10/19/06

2 core sections Processors: AScone, J Saul
0-4' 4" - 9' 3" > 5H

Geologist: M Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|--|
| | 0 < > 5.1 | Sand (SP) 75-100% Fine grained sand 0-25% Fines, medium gray, loose, stiff micaceous, well sorted | Logging conducted in accordance to USGS sediment sampling guidance Modified ASTM |
| | 5.1 < > 9.0 | Sand (SW) 75-100% Fine grained sand, 0-25% Fines, 0-25% medium grained sand, trace fine gravel medium grained sand consists of lithic and mineral fragments (Cinder basalt / Quartz feldspar, mica) sub rounded to sub angular, gravel consist of lithic sub angular to sub rounded fragments medium gray, loose, stiff, micaceous, poorly sorted | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |
| | < > | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/06

Samplers: JB/SC/BJ/DD

Station Location: Outside Edge of proposed site -
moving upstream

Station ID: POV-~~347~~

Coordinates:

| Latitude/Northing | Longitude/Easting |
|------------------------------|-------------------|
| <u>10:45</u> 45°39.2541 N | 122°45.4094 W |

Measured Water Depth: -43.5' (Leadline) / Sounder / Other 43.5' w/90 10/13/06

Vertical Datum: +2.49' (MLLW / MLW / Other CRD)

Mudline Elevation: -41.01'

Estimated Penetration: 12.8"

Refusal: None

Total Core Length: 9' 10"

Percent Recovery 78 (%)

Core/Drive Comments: 4' 2" Open / Fine-Medium grained sand / slightly more water
in core material than the previous two samples

SEDIMENT CORE PROCESSING:

Date: 10/16/06

3 Sections
0-4, 4-8, 8-9.5"

Processors: MS/Marshall/AS

Geologist: MS/Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| | 0 <> 4.2 | <u>Sand (SP) 75-100% fine grained sand, 50-25% Fines, medium gray, loose, soft to stiff, micaceous, well sorted</u> | <u>* Logging conducted in accordance to LWB Guidance for sediment sampling, Modified ASTM</u> |
| | 4.2 <> 6.4 | <u>Sand (sw) 75-100% fine grained sand, 25% fine gravel, lithic, subangular, 25% fines, micaceous, medium gray, loose, stiff, trace medium grained sand poorly sorted</u> | |
| | 6.4 <> 8.9 | <u>Sand (SP) 75-100% fine grained sand, 25% fines, micaceous, medium gray loose, stiff, thin bed of medium grained sand 7.6 to 7.8 feet, consist of lithic and mineral fragments (cinder + basalt / Quartz? fdd spav + mica) well sorted</u> | |
| | <> | | |
| | <> | | |
| | <> | | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/13/06

Samplers: JB/SC/EJ/DD

Station Location: Upstream end of project - from outside edge of dredge area to inside edge of dredge area

Station ID: POV-48

Coordinates:

| | |
|--------------------|---------------------|
| Latitude/Northing | Longitude/Easting |
| <u>45°39.2213N</u> | <u>122°45.3140W</u> |

Measured Water Depth: -39.7' (Leadline / Sounder / Other _____)

Vertical Datum: +2.85' (MLLW / MLW / Other CRD @ 1130)

Mudline Elevation: -36.85'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 10' 1"

Percent Recovery 80 (%)

Core/Drive Comments: 3' 0" open / sand, in core nose was fine → med → coarse grained / sand in cuts between sections A+B and section B+C were fine → med-fine sand.

SEDIMENT CORE PROCESSING:

Date: 10/16/06

3 sections 0-4, 4-8, 8-9' 8"

Processors: ASomes MS Marshall

Geologist: MS Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|---|---|
| | 0 < > 4.1 | Sand (SP) 75-100% Fine grained sand 25% Fines, trace med micaceous, medium gray loose, st. PF, well sorted | * Testing conducted according to LW6 Guidance for Sediment Sampling - Modified ASTM |
| | 4.1 < > 5.1 | Sand (SW) 50-75% Fine grained sand 25-50% medium grained sand, 0-25% Fines Trace, Fine gravel, medium grained sand consists of lithic and mineral fragments, subrounded gravel consists of lithic, subangular fragments, micaceous, medium gray loose, st. PF, poorly sorted | |
| | 5.1 < > 7.9 | Sand (SP) 75-100% Fine grained sand 25% Fines, trace medium grained sand consists of lithic and mineral fragments same material and shape as above, micaceous medium gray, loose, stiff, well to moderate sorting | |
| | 7.9 < > 8.8 | Sand (SW) 50-75% Fine grained sand 0-25% medium grained sand, 0-25% Fines trace coarse grained sand, medium grained sand consists of lithic and mineral fragments subrounded to subangular, micaceous, medium gray, loose, st. PF, trace coarse grained sand consists of subangular lithic fragments | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/18/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving into single ^{DMMU} section sections at upstream end of dredge area Station ID: POV-49

| | | |
|--------------|----------------------------|-------------------|
| Coordinates: | Latitude/Northing | Longitude/Easting |
| 1009 | 45° 39.1709 W N | 122° 45.2402 W |

Measured Water Depth: -40.7 (Leadline / Sounder / Other _____)
 Vertical Datum: +0.30' (MLLW / MLW / Other ICRD @ 10:15)
 Mudline Elevation: +40.4'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 9' 7" Percent Recovery 76 (%)

Core/Drive Comments: 4' 5" Open / Med. sand and thin layer of brown silt on surface of core / med sand with a few pieces coarse material at cut between core sections A+B / some materials in core nose

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Processors: ASomas, Saul
2 core sections 0-4' / 4-9' 2" Geologist: M. Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|-------------------------------|
| 0 | <> 5.6 | Sand (SP) 75-100% Fine grained sand, 0-25% Fines, medium gray loose, stiff, micaceous | ASTM Modified ASTM |
| 5.6 | <> 6.4 | Sand (SP) 50-75% Fine grained sand 0-25% medium grained sand 0-25% Fines, medium grained sand consists of lithic and mineral fragments (cinder basalt / quartz, feldspar, mica) subrounded medium gray loose, stiff micaceous, well to moderately sorted | |
| 6.4 | <> 6.5 | Silt (ml) 75-100% Fines, low plasticity rapid dilatancy, medium gray | |
| 6.5 | <> 8 | Sand (SP) 50-75% Fine grained sand 0-25% medium grained sand, 0-25% Fines trace coarse grained sand, medium grained sand consists of lithic and mineral fragments of same material and shape as above, coarse sand is lithic and subangular alternating thin beds of medium and coarse grained sand (5-10cm) in between beds (20-30cm) | |

of fine grained sand, medium gray, loose stiff, micaceous, moderately sorted
 Can no contact are shard others are ... Page 1 of 1

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/18/06

Samplers: TB/SC/BJ/DD

Station Location: Moving into another single datum at upstream end of dredge area

Station ID: POV-50

Coordinates:

| Latitude/Northing | Longitude/Easting |
|----------------------|-------------------|
| 10:39 45°39.1567N | 122°45.1395W |

Measured Water Depth: -29.2' (Leadline / Sounder / Other _____)

Vertical Datum: 0.13' (MLLW / MLW / Other +CRDC 10:45)

Mudline Elevation: -29.07'

Estimated Penetration: 12' 8"

Refusal: None

Total Core Length: 98' 0"

Percent Recovery 63 71 (%)

Core/Drive Comments: 5' Open / med. sand with 1-2 mm layers of brown silt + fine sand at surface of core / also wood fragments on surface of core / med sand with some gravel (worn rounded) at cut between core sections A & B / same materials in core nose.

SEDIMENT CORE PROCESSING:

2 core sections 0-4' / 4'-8' 8"

Processors: A Somes & Saul

Date: 10/19/06

Geologist: M Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|---|
| 0 | <> 4.3 | Sand (SP) 75-100% fine grained sand 0-25% Fines, trace medium grained sand consists of lithic and mineral fragments (Cinder, basalt/Quartz, Feldspar, mica) subangular to subangular, medium gray, loose, stiff micaceous, moderate to well sorted | Logging conducted in accordance to LWG Sediment Sampling Guidance modified ASTM |
| 4.3 | 4.7 | Sand (SW) 50-75% fine grained sand, 0-25% medium to coarse grained sand 0-25% Fines, 0-25% wood debris. trace fine gravel, medium grained sand consists of lithic and mineral fragments of same material and shape as above coarse grained sand and gravel consists of lithic subangular fragments, medium gray, loose, stiff, micaceous, poorly sorted | |
| 4.7 | 6.6 | Sand (SP) same as 0-4.3 feet | |
| 6.6 | 8 | Sand (SW) 50-75% medium grained sand, 25-50% fine grained sand, 0-25% Fines trace coarse grained sand, medium grained sand consist of same material and shape as above | Trace fine gravel |

coarse grained sand same as above, fine gravel is lithic subangular fragments, medium gray, loose, stiff micaceous moderately sorted

SEDIMENT CORE SAMPLING:

Date: 10/18/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving upstream in the single DMMU group to the most upstream extent of the dredged area. Station ID: POV-51

Coordinates: 11:14

| Latitude/Northing | Longitude/Easting |
|-------------------|-------------------|
| 45° 39.1230N | 122° 45.0919W |

Measured Water Depth: -26.8' (Leadline / Sounder / Other Hose Mark)
 Vertical Datum: *(-) 0.02' (MLLW / MLW / Other ICRD @ 11:15)
 Mudline Elevation: -26.82'
 Estimated Penetration: 12' 8" Refusal: None
 Total Core Length: 8' 6" Percent Recovery: 67 (%)

Core/Drive Comments: lots of water in core
Moved barge over exact location of station 51/verified OK to sample of station by approx. 20 ft. with Andrew Somers / actual sample collected about 10 ft from exact GPS location / 5' 6" open / med. sand with 1-2 mm layer of brown silt/fine sand plus some gravel on surface of core / material the same at cut but was on core section

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Processors: ASomes I Sawl
2 core sections 0'-4' / 4'-8' 1" Geologist: M Marshall

| Core Section(s) | Depth (<in>) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|--------------|--|--------------------|
| | 0 <> 2.3 | <u>Sand (SP) 75-100% fine grained sand 0-25% fines, medium gray, loose, stiff micaceous, well sorted</u> | |
| | 2.3 <> 4.1 | <u>Sand (SW) 50-75% fine grained sand 0-25% medium grained, 0-25% fines, trace 0-25% coarse grained sand, trace fine gravel medium grained sand consist of lithic and mineral fragment (andesite/basalt/Quartz, feldspar mica) subrounded to subangular, coarse grained sand and gravel consist of lithic subangular fragments, moderate to poorly sorted medium gray, trace loose, stiff, micaceous</u> | |
| | 4.1 <> 5.6 | <u>Sand (SP) the same as 0-2.3 feet</u> | |
| | 5.6 <> 8 | <u>Sand (SW) 25-50% medium grained sand 0-25% fine grained sand 0-25% coarse grained sand, 0-25% fine gravel, the 0-25% fines, medium grained consist of lithic and mineral fragments of same material and shape as above, coarse grained sand and gravel consist of lithic subangular fragments, medium gray, loose, stiff, micaceous, moderately sorted</u> | |

PARAMETRIX SEDIMENT CORE LOG SHEET

Project Number: _____

SEDIMENT CORE SAMPLING:

Date: 10/18/06 Samplers: JB/SC/BJ/DD
 Station Location: Moving upstream in the single drum group to the most upstream extent of the dredge area Station ID: POV-52

Coordinates: 11:46

| Latitude/Northing | Longitude/Easting |
|----------------------|-----------------------|
| <u>45° 39.1040 N</u> | <u>122° 45.0981 W</u> |

Measured Water Depth: 38.4' (Leadline / Sounder / Other Chase Mark)

Vertical Datum: -0.14' (MLLW / MLW / Other ± CRD @ 11:45)

Mudline Elevation: -38.54

Estimated Penetration: 12' 8" Refusal: None

Total Core Length: 8' 3" Percent Recovery 65 (%)

Core/Drive Comments: 5' 9" Open / Med. sand with 1-2mm layer brown silt / fine sand with a few small weed fragments at surface of core / med. sand with some gravel and cut between core sections A + B / some materials in core

SEDIMENT CORE PROCESSING:

Date: 10/19/06 Aut Processors: ASomes, Isaul
0-4' 4" - 7' 10" Geologist: M. Marshall

| Core Section(s) | Depth (ft) | Core Profile/Comments | Sample ID(s)/Info. |
|-----------------|------------|---|--------------------|
| 0 | < > 2.7 | Sand (SP) 75-100% Fine grained sand 0-25% medium grained sand, Fines, trace coarse grained sand medium grained sand consist of lithic and mineral fragments (cinder, basalt / quartz Feldspar, mica) sub rounded to subangular | Mod. Fied ASTM |
| | < > | Medium gray, loose, stiff, micaceous coarse grained sand consist of lithic subrounded fragments moderately sorted | |
| 2.7 | > 3.6 | Sand (SW) 50-75% Fine grained sand, 0-25% medium grained and coarse grained sand, 0-25% Fines, trace fine gravel, medium grained sand consists of lithic and mineral fragments of same material and shape as above, medium gray, loose, stiff, micaceous, gravel consists of lithic subrounded to subangular fragments, moderate to poorly sorted | |
| 3.6 | 7.6 | Sand (SP) same as 0-2.7 feet | |
| | < > | | |
| | < > | | |